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OXYGEN POISONING IN MAN

BY

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PART I

The recent war greatly stimulated the study of human tolerance to various changes in environment. This article confines itself to tolerance to increased tensions of oxygen, though there are other important factors at increased pressures which are not considered here. At sea-level there is an oxygen tension of about 159 mm. of mercury, and this is the maximum oxygen tension encountered in any natural environment. The oxygen tension in the tissue spaces of warm-blooded animals is from 20 to 40 mm. of mercury. In under-water work man, by means of various appliances, breathes gases at the pressure to which he is exposed, this being the first essential of prolonged under-water existence. The second essential is that his respiratory movements must continue within their normal range and with their normal frequency. The third is that the gases to which he is exposed must not be noxious, either at the time of exposure or on returning to normal atmosphere. Under most operational conditions it is preferable that the diver is self-dependent and carries his respiratory gases with him. If he carries air, then this must be expelled from his apparatus after each breath and there is great wastage and exposure to dangerous tensions of nitrogen. If he carries oxygen, this gas can be employed not only for metabolic purposes but for the essential rinsing of the lungs during respiratory movement. Thus no gas is wasted and maximum endurance for a minimum load is possible. It would appear, therefore, that oxygen is the ideal gas for this purpose, provided it is devoid of toxic effects. It is almost certain that the tissues of man, when breathing oxygen at increased tensions, are exposed to an internal environment which has been previously unknown to living matter, and it is therefore difficult to postulate what the reaction to such tensions would be. Whales, in deep dives, protect their general tissues by the complete collapse of their relatively small lungs and transfer of the gases to the inactive dead space.

The first important contribution to this subject was made by Paul Bert in 1878. His pioneer work has withstood the test of time in a most impressive manner. He showed that oxygen at increased pressures was highly poisonous and that no living matter was exempt. Larks exposed to 15–20 atmospheres of air convulsed and finally died. In a large series of experiments Bert showed that the oxygen tension was the decisive factor in the immediate effect of air or of any mixture of nitrogen and oxygen. Lorrain Smith (1899) next demonstrated that animals breathing oxygen at moderately high tensions over prolonged periods suffered severe and finally fatal pulmonary damage. An enormous amount of animal experimentation followed, but "L'effet Paul Bert" (convulsant) and "L'effet Lorrain Smith" (pulmonary irritation) remained the cardinal features of oxygen poisoning.

With regard to human experiments, the first recorded were by Bornstein and Stroink (Bornstein, 1910; Bornstein and Stroink, 1912), who breathed oxygen for 45 minutes at 3 atmospheres absolute (ats. abs.) in the Elbe tunnel without ill effect. In 1912 Bornstein suffered from clonic spasm of the legs while riding an ergometer under similar conditions for 51 minutes. In 1930 the late Dr. J. S. Haldane (Haldane and Priestley, 1935) reported confusion and amnesia in deep-sea air divers at 300 ft. (91.4 m.), and these symptoms were attributed to the raised tension of oxygen. These effects were proved by Behnke *et al.* (1935) to be due to the intoxicant effect of nitrogen at high pressures. Yet as a result of this misconception diving on pure oxygen was limited in the Royal Navy to 2 ats. abs. (apart from submarine escape). In 1933 two Royal Naval officers, Damant and Phillips, breathed oxygen at 4 ats. abs. in compressed air. Convulsive symptoms occurred in 16 and 13 minutes respectively. Phillips suffered a major convulsion after being turned on to air but while still at 4 atmospheres pressure (Thomson, 1935). In 1934–6 Behnke and co-workers carried out a series of human experiments. Only two exposures were made at 4 atmospheres, where one subject suffered acute syncope after 43 minutes. The other subject convulsed after 44 minutes. At 3 atmospheres four subjects breathed oxygen for three hours with no demonstrable ill effect. In a second series at this pressure the experiment was continued into the fourth hour, when three subjects suffered abrupt onset of vertigo, nausea, and a sensation of impending collapse. Concentric contraction of the visual field was also demonstrated. These results were published and obtained widespread recognition and acceptance. Throughout the world it was assumed that men at comparative physiological rest, as in these experiments, were safe breathing oxygen for at least 30 minutes at 4 atmospheres, and for at least three hours at 3 atmospheres. In time even the proviso concerning rest was usually omitted. The British finding appeared to have

been unnoticed, or forgotten, even in Great Britain. In 1941 J. B. S. Haldane reported a convulsion after breathing oxygen for under five minutes, at a pressure of 7 ats. abs., during experiments related to the *Thetis* disaster.

The investigations of oxygen poisoning described here were started in April, 1942, owing to the occurrence of several cases of unconsciousness in oxygen-breathing apparatus at depths and in times which were then considered to be safe. The Admiralty Experimental Diving

FIG. 1.—Subject breathing oxygen under pressure.

FIG. 2.—Soft-helmeted counter-lung oxygen-diver. (Human torpedoes.)

[*Admiralty Photos.*

Unit was created to investigate this and other urgent problems of high-pressure physiology. The main body of human experiments described in this article were carried out between June, 1942, and February, 1943. No experimental dives where men had breathed pure oxygen at toxic tensions under water had yet been reported. The object of these experiments was to gain a more comprehensive picture of oxygen poisoning in the human. Large groups of subjects were therefore employed, and over 2,000 experiments were carried out. Great care was taken to avoid an heroic or "Jules Verné" atmosphere.

The Marked Variation of Oxygen Tolerance in Man

The first series of experiments to be carried out was to determine the oxygen tolerance of a group of healthy male subjects at a fixed oxygen tension (3.7 ats. abs.). This series was carried out in a pressure chamber of 100 c. ft. (2.83 m.^{3}) capacity. The subject was seated opposite two observers who were in telephonic communication with those outside. All subjects breathed oxygen at pressure until acute symptoms occurred. Experiments in compressed air have a number of advantages. The subject's state can be easily observed and subjective end-points are less likely. Convulsions are a lesser risk. Oxygen was breathed from a Siebe Gorman "salvus" apparatus. Efficient rinsing out of the subject's lungs was carried out and repeated frequently. A series of analyses, however, showed that even with this regime it was difficult to maintain a concentration higher than 95% of oxygen. In most exposures the pulse and respiratory rates were noted every five minutes. Subjects varied from cooks to recently trained divers, experienced divers, submarine ratings, medical officers, special service operational personnel, and mine-disposal officers and ratings. All were Grade A1 in fitness, and ages varied from 18 to 40 years. Experiments carried out in this manner are referred to hereafter as in the "dry," in contrast to those carried out under water and referred to as in the "wet." The results of these experiments are given in Table I and shown graphically in Fig. 4 (in the "dry").

TABLE I.—*Oxygen Poisoning at 90 ft. (27.4 m.) in the Dry in 36 Subjects in Order of Performance*

Exposure (mins.)	Symptoms	Exposure (mins.)	Symptoms
96	Prolonged dazzle; severe spasmodic vomiting	18	Vertigo and severe lip-twitching
67	Severe lip-twitching	18	Vertigo + +; epigastric aura
62	Euphoria and lip-twitching	17	Lip-twitching
62	Nausea and vertigo; arm twitch	17	Lip-twitching; spasmodic respiration
54½	Severe lip-twitching	17	Lip-twitching; spasmodic respiration
51	Dazzle and lip-twitching	16½	Slight lip-twitching
50½	Blubbering of lips; fell asleep	16	Severe lip-twitching; spasmodic respiration
50½	Dazed and lip-twitching	15½	Inspiratory predominance; lip-twitching and syncope
34½	Nausea, vertigo, lip-twitching	15	Nausea, syncope, and confusion
33	Convulsed	14	Lip-twitching
32	"	12½	"
32	Severe lip-twitching	9	Dazed and lip-twitching; paraesthesiae
30	Convulsed	9	Lip-twitching and vertigo
26½	"	7½	Severe lip-twitching
25½	Drowsiness and lip-twitching	7	"Diaphragmatic spasm"
24½	Severe lip-twitching	6	Severe nausea
23	Lip-twitching; epigastric aura	6	Severe lip-twitching
20½	Lip-twitching; twitch L. arm; amnesia		
19½	Convulsed		

Out of 36 subjects five convulsed, the rest recovered on being turned on to air. The most striking finding was the enormous variation in oxygen tolerance in a group of human beings. Exposures causing marked symptoms at this tension varied from 6 to 96 minutes. The tolerance of each subject was unpredictable. Many attempts to correlate tolerance with age, height, weight, physical fitness, athleticism, smoking, ingestion of alcohol, psychological health, or personality assessments all failed. Symptoms will be discussed in detail later.

The times of exposure causing acute symptoms show a skew type of distribution, notable examples of which are

the response of animals and insects to drugs and hormones. It is clear that the previously reported times of safety at this pressure were dangerously incorrect; in addition, no allowance had been made for individual variation, which is found to be over an enormous range.

Oxygen Tolerance under Water

It has already been emphasized that up to the beginning of these investigations all experiments regarding oxygen tolerance had been carried out by subjects in dry chambers. A series of dives was initiated to discover whether man's tolerance under water was similar to that so far determined in compressed air. The experimental arrangements can be seen in Fig. 3, which is self-explanatory. The respiratory apparatus was a modification of the Davis submarine escape apparatus adapted for four hours' endurance. A light rubberized canvas suit with a soft helmet was worn. The diver was submerged in an open tank and tested for leaks; he then walked to the high-pressure tank and was lowered into the water. The upper hatch was closed and air pressure rapidly applied. The diver was thus exposed to the increased pressure but was under water. On the average, subjects were breathing oxygen, mostly at atmospheric pressure, for ten minutes before arriving at the appropriate experimental depth. Time of compression averaged 90 seconds. The temperature of the water was maintained at 65° F. (18.3° C.). As the depth reading was of the air pressure above the water, the oxygen was breathed at an additional 3 ft. (0.91 m.) of water pressure (see Fig. 3).

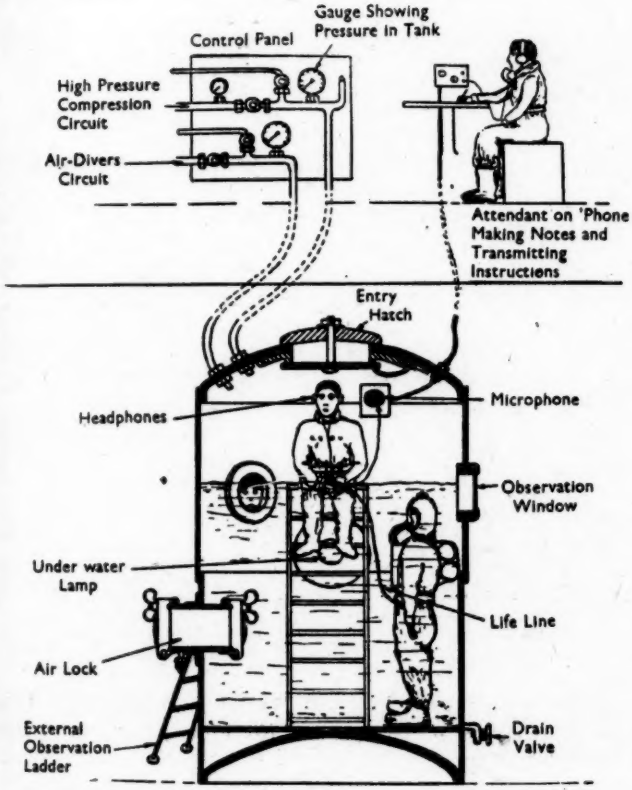

FIG. 3.—Showing wet pressure chamber with diver under water breathing oxygen in self-contained set. Internal and external attendants.

The first series of dives was to 50 ft. (15.2 m.) (2.5 ats. abs.) and the time limit was 30 minutes. One hundred different subjects were employed. If the diver convulsed or had severe symptoms he was hauled out of the water and turned on to air. The mouthpiece acted as an excellent gag during convulsions, and attendants were taught to maintain a good airway. Out of these 100 subjects 26 convulsed, 24 had symptoms, and 50 had no symptoms. Space does not allow details. According to previously accepted figures men were safe breathing oxygen at this depth for at least two hours. The great variability, already demonstrated, makes hard-and-fast rules impossible, but, even allowing for this variation, it was strongly suggested that there was a marked decrease of average tolerance compared with that obtaining in the experiments in compressed air.

A series of dives was therefore carried out to compare the tolerance of subjects in compressed air, and under water, at 60 ft. (18.3 m.) and 90 ft. (27.4 m.) pressure of sea-water. In the first series six subjects were employed. At 60 ft. in the "dry" the subjects tolerated oxygen-breathing for 180, 120, 120, 158½, 101, and 51 minutes, in the first three cases without symptoms. At the same pressure under water the same subjects experienced acute poisoning in 76, 37½, 25, 61, 19, and 12½ minutes respectively. At 90 ft. their performances in the "dry" were 51, 54½, 62, 34½, and 32 minutes, whereas under water they survived only 12, 11, 25½, 18½, and 9½ minutes respectively (one subject indisposed in this series). All these exposures at 90 ft. were terminated by acute symptoms. A larger series of "wet" and "dry" experiments at 90 ft. is shown in Fig. 4. It will be seen from these results that oxygen

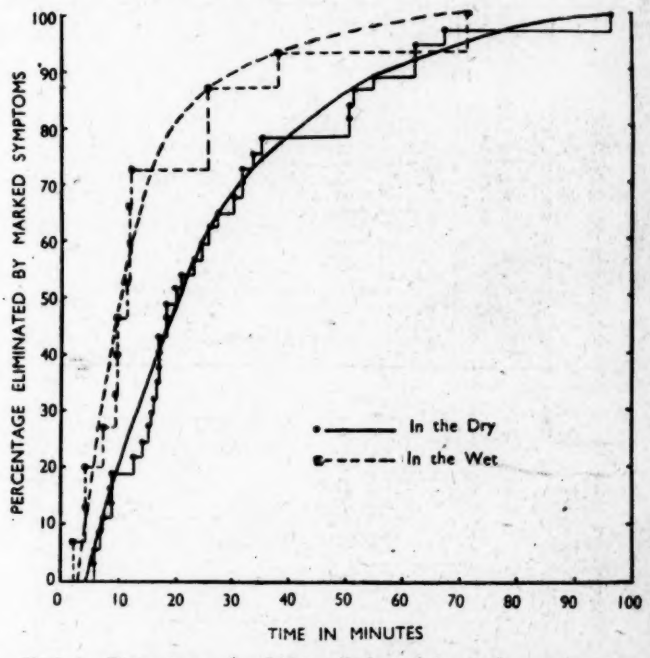

FIG. 4.—Percentage of subjects eliminated by toxic symptoms at 90 ft. (3.73 ats. abs.) breathing oxygen in compressed air and under water (65° F.) in diving-suit. No work performed.

tolerance is greatly decreased when the subject is under water. The enormous importance of this finding need hardly be pointed out. The causes of this impairment remain unknown. There is the added 3 ft. (0.91 m.) of pressure already mentioned, and the diver is breathing pure oxygen in contrast to 95% approximately in the "dry." These two factors are quite inadequate to explain the phenomenon completely. Carbon dioxide accumulation was suspected, as this is known to increase susceptibility to oxygen poisoning in animals (Hill, 1933). Numerous gas analyses negated this possibility. The lack of a rigid helmet, respiratory resistance, the bandaging effect of the suit, the diver's posture, and hydrostatic effects have all been investigated with negative results.

Time–Pressure Relationship for Men Breathing Oxygen Under Water

Next an attempt was made to plot individual curves expressing the relationship of time of survival to pressure. In view of the individual variation it was realized that each diver would have a different curve of tolerance. After a large number of experiments a new factor became increasingly manifest. The tolerance of individual subjects varied from day to day, and it was quite impossible to plot a curve for a single individual. Certain subjects showed this individual variation to a greater degree than others. As with the variation between individuals, no cause for this varying susceptibility to oxygen poisoning could be discovered. In view of these findings, a subject of apparently good resistance was chosen. He dived twice a week over a period of three months to a constant depth of 70 ft. (21.3 m.) in the "wet" (3.12 ats. abs.). He wore the same suit and apparatus on all occasions. All dives were carried out about 11 a.m., after an early and light breakfast. His end-points were usually very definite and his health excellent throughout. The results are given in Table II with end-points and

TABLE II.—*Tolerance of a Single Diver at 70 ft. (21.3 m.) in the Wet over a Period of 90 Days*

Day in Series	Time (mins.)	Symptoms
1	7	Lip-twitching +
7	12½	Nausea +
9	86	Auditory hallucinations, lip-twitching
15	27	Lip-twitching +
17	23	" +
20	21	" +
30	28	" +
34	61	" +
37	148	Feeling "cross-eyed"; lip-twitching
42	37½	Lip-twitching; coughing
44	96	Lip-twitching; stertorous breathing
48	31½	Lip-twitching +
56	67½	Lip-twitching
70	62½	Lip-twitching; tinnitus; choking sensation; gasping; confusion
72	43	Lip-twitching +
76	41½	Lip-twitching; vertigo; dazzle
78	82	Lip-twitching; dazzle; dyspnoea
80	29½	Lip-twitching; nausea
83	125	Dazzle; amnesia
90	78	Nausea; severe lip-twitching

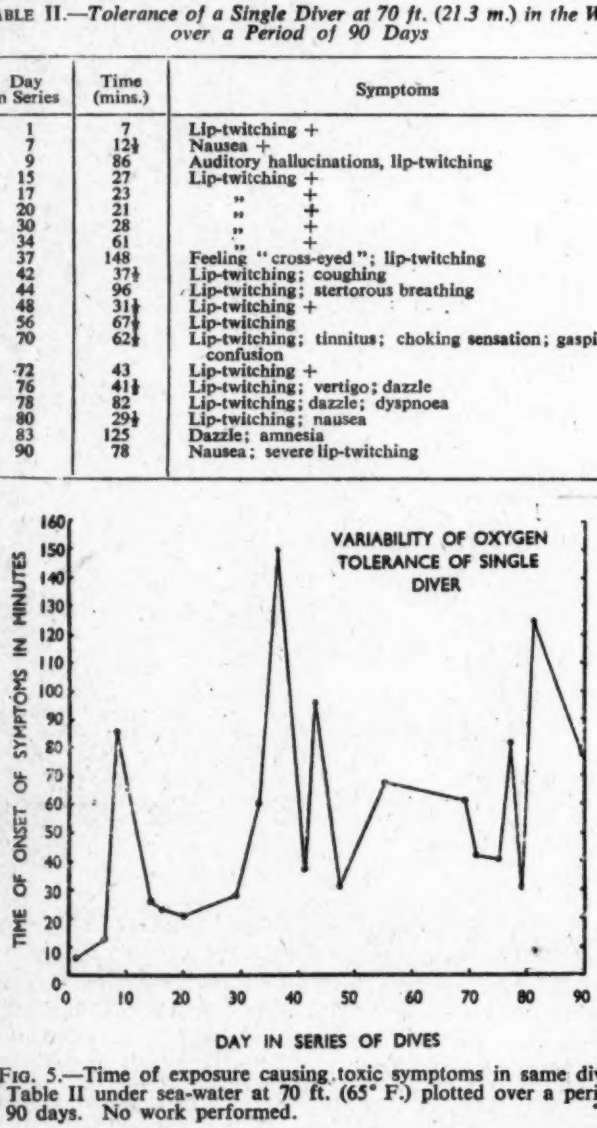

FIG. 5.—Time of exposure causing toxic symptoms in same diver as Table II under sea-water at 70 ft. (65° F.) plotted over a period of 90 days. No work performed.

in Figs. 5 and 6. The curve of distribution obtained was very similar to that showing variation of tolerance in a group. Statistical analysis showed that this subject had a greater variance of toleration than the average. A larger series of experiments confirmed this individual variation. Good examples, in one series, were those divers who survived 100 minutes under water at 50 ft. (15.2 m.). The averages of all their other performances at this depth were 22, 19, and 15 minutes. One subject, who convulsed after 12 minutes at 50 ft., completed 100 minutes at 50 feet

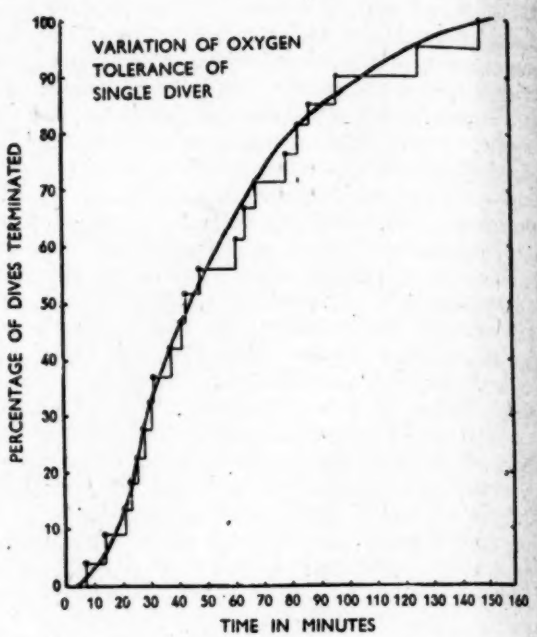

FIG. 6.—Percentage of dives terminated owing to toxic symptoms as a function of duration of exposure. Depth throughout, 70 ft. of sea-water (65° F.). Dives over a period of 90 days. No work performed.

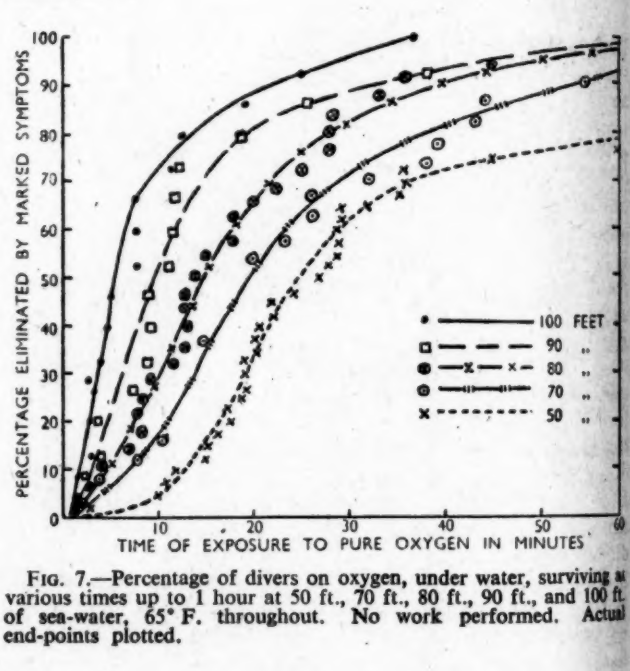

FIG. 7.—Percentage of divers on oxygen, under water, surviving at various times up to 1 hour at 50 ft., 70 ft., 80 ft., 90 ft., and 100 ft. of sea-water, 65° F. throughout. No work performed. Actual end-points plotted.

without symptoms 16 days later. Six days after this he again convulsed at 50 ft. in 32½ minutes. Such findings make it clear that to dive on oxygen to any toxic pressure involves a risk that it is impossible to assess, even if the diver's tolerance has been previously determined.

It now became apparent that the only satisfactory method of assessing oxygen tolerance at various pressures was to employ groups of men for each pressure. Dives were

carried out in the "wet" to a definite end-point by groups of subjects at 50, 60, 70, 80, 90, and 100 ft. in an attempt to obtain a clear overall picture. The results are shown in Fig. 7. The increased toxicity as the depth becomes greater is clearly shown. The highly skew distribution conforms satisfactorily with the Galton-MacAlister law, and it can be demonstrated that all curves in Fig. 7 are the same curve. In other words, the variability of the group is independent of the depth. The coefficient of variation has the huge values of 76–109%, as compared with about 3–4% for such human characters as height, arm length, and alveolar carbon dioxide level. Even more remarkable is the fact that a single diver gave a graph (Fig. 6) of the same type with a coefficient of variation of 67%. This means that a single man may be almost as variable as a group, though this is exceptional. Statistical analysis shows that only 40% of the total variation of oxygen divers is accounted for by day-to-day variation of each individual diver. The other 60% is due to variation between the averages of the different divers.

Maximum Non-toxic Depth under Water at Rest

Next an attempt was made to discover at what pressure, under water, oxygen ceases to cause toxic nervous symptoms that would make free diving dangerous. As work is generally known to impair tolerance the investigation was first carried out without exercise. A large number of dives for a maximum of two hours was performed, and toxic symptoms, and even convulsions, were encountered at 40 ft. (12.2 m.), 35 ft. (10.7 m.), and 30 ft. (9.1 m.). The results may be summarized as follows:

Depth (feet)	No. of Subjects	No. with Symptoms	No. Convulsing
40	29	15	4
35	21	6	1
30	20	3	2
25	28	0	0

It is possible that longer exposures may have caused symptoms at 25 ft. (7.6 m.), but this period is longer than any practical dive on oxygen to this depth. It must be remembered that these divers were exposed to a pressure of oxygen that would occur with a sounding of 32 ft. (9.7 m.). It is a most surprising finding to obtain oxygen convulsions at as low a pressure as 33 ft. (10.1 m.) of sea-water (2 ats. abs.). At such a tension the oxygen dissolved in the blood plasma is inadequate for even basal metabolic requirements, and the haemoglobin is still being actively employed for oxygen transport. Gesell (1923) had suggested that the deactivation of the haemoglobin cycle rendered this substance unavailable for carbon dioxide transport from the tissues and that this caused a severe tissue acidosis. Campbell (1930), by his nitrogen injection technique, had confirmed that there was a remarkable rise of tissue carbon dioxide tension at the usual convulsant levels employed in animal work. However, at the minimal tension causing convulsions in these experiments the carbon dioxide tension was shown by Campbell to be hardly raised. It would appear, therefore, that accumulation of carbon dioxide in the tissues is not the essential cause of oxygen convulsions; and this is in accord with more modern research, which will be discussed later.

Effect of Work on Oxygen Tolerance

It has been generally accepted that work diminishes tolerance to oxygen at increased tensions. However, no reliable experimental data are available. *Il Polombaro* (Italian Ministry of Marine, 1938) gives tables showing a marked effect of work, but these figures appear to be entirely theoretical. A further programme of experimental exposures was therefore carried out in the "wet" with hard work. Controls with the diver resting were also performed. Subjects worked vigorously by lifting a large bag of weights by pulley. Dives were carried out at 50, 40, 35, and 25 ft. These experiments showed conclusively that oxygen tolerance is markedly diminished by work. Figs.

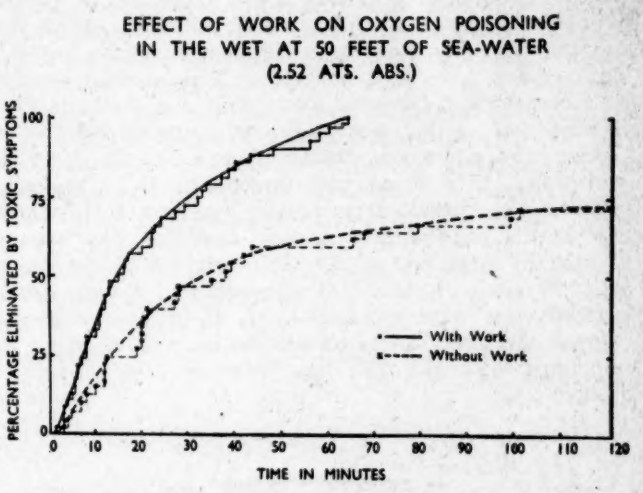

FIG. 8.—Percentage of divers eliminated by toxic symptoms at 50 ft. in the wet (2.52 ats. abs.) during a period of 2 hours, with and without work: 46 divers working, 41 not working. Temperature throughout, 65° F.

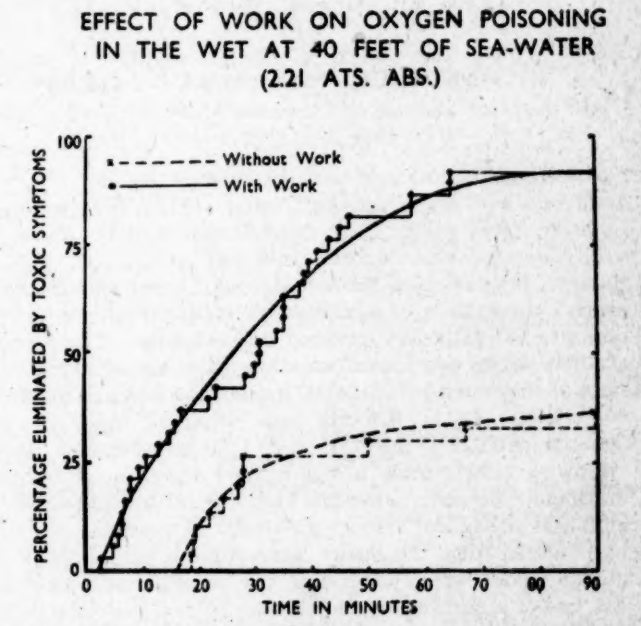

FIG. 9.—Percentage of divers eliminated by toxic symptoms at 40 ft. in the wet (2.21 ats. abs.) during 90 minutes, with and without work: 39 working, 31 not working. Temperature throughout, 65° F.

8 and 9 show the results at 50 ft. and 40 ft. with and without work. Even at 25 ft. toxic symptoms occurred in five out of 18 subjects, though no convulsions were recorded.

The physiological reasons why work reduces oxygen tolerance are not at present definitely known. A further increase of carbon dioxide in the tissues is an obvious possibility, though more reduced haemoglobin is available for carbon dioxide transport. The rise of alveolar carbon dioxide, which is probably very marked when exercising on pure oxygen (to be discussed in later publications), presumably causes cerebral vasodilatation, which may be another adverse factor.

Effect of Temperature on Oxygen Poisoning

Previous work had indicated that the lowering of the environmental temperature increased the oxygen tolerance of small experimental animals (de Almeida, 1934; Campbell, 1937). Three series at 50 ft. were performed, at 87.5° F. (30.8° C.) (steam-heated), at 45° F. (7.2° C.) (ice-cooled), and control exposures at 65° F. (18.3° C.). Divers were allowed to vary their underwear under the suit as the application of this work to operational problems was the first consideration. It is doubted if these exposures could have been tolerated without this variation in clothing. No exercise was carried out. This was advantageous at a higher temperature but disadvantageous to the diver in cold water. The divers complained bitterly of the cold and found the heated dives equally uncomfortable. These experiments showed that oxygen tolerance was equally affected by heat and cold. Although the performances below 30 minutes were only slightly impaired all outstanding performances were eliminated. It is possible that this delayed effect was due to changes in body temperature, as symptoms suggested that this occurred after about 20 minutes.

[To be concluded, with a bibliography, in next week's issue.]

THE NICOTINAMIDE SATURATION TEST

BY

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Nicotinamide saturation tests have been carried out by numerous workers (Holt and Najjar, 1943; Ellinger and Coulson, 1944; Ruffin, Cayer, and Perlzweig, 1944; Roberts and Najjar, 1944; Coulson, Ellinger, and Smart, 1945; Ellinger, Benesch, and Hardwick, 1945), based on the daily urinary elimination of nicotinamide methochloride and the response to orally administered nicotinamide. These tests are believed to provide information about the nicotinamide state of the tested person, and, indeed, the findings by Holt and Najjar (1943), Roberts and Najjar (1944), Ellinger, Benesch, and Kay (1945), and Ellinger, Benesch, and Hardwick (1945) show a significantly lower nicotinamide methochloride elimination and response to ingested nicotinamide in pellagrins than in physically fit persons. This is remarkable, since the intake, consumption, and storage of nicotinamide, which determine the nicotinamide state of the body, are probably not the only factors responsible for the extent of the elimination of nicotinamide methochloride. Ellinger and Coulson (1944) mentioned the presence of "methyl-donators" and the efficiency of the methylating mechanism as influencing the extent of nicotinamide methochloride elimination. Malabsorption from the intestines was earlier considered as a possible aetiological factor in pellagra (Ellinger, Hassan, and Taha, 1937), and it was proved to affect the response to ingested nicotinamide in pellagrins but not in healthy persons (Ellinger, Benesch, and Kay, 1945). The recent knowledge of the importance of the intestinal flora for the nicotinamide intake (Ellinger, Coulson, and Benesch, 1944; Ellinger, Benesch, and Kay, 1945; Najjar, Holt, Johns, Medairy, and Fleischmann, 1946), the fact that some intestinal bacteria consume nicotinamide, and the findings by Koser and Baird (1944) that, *in vitro*, some strains of *Pseudomonas* and *Serratia*, and by Benesch (1945) that anaerobes from the intestines, also *in vitro*, destroy nicotinamide, suggest other factors influencing the response to orally administered nicotinamide. It was desirable to study the influence of these various factors on the response to ingested nicotinamide. Unfortunately the number of cases of various liver diseases was so far not large enough for study of the effect of the methylating mechanism, and experiments on rats with induced liver diseases were not yet conclusive (Ellinger, 1946).† But the effect on the response to ingested nicotinamide of the presence of "methyl-donators" and of the route of ingestion could be studied, and this forms the subject of the present communication.

Experimental

Experiment 1.—On 5 healthy persons (2 males, 3 females) and 1 diabetic male, balanced by diet and insulin, of known low methylating capacity (Nos. 1-6). The daily nicotinamide methochloride elimination was measured in 24-hour samples of urine for 3 days without extradietary intake of nicotinamide and, on the 4th day, after the oral ingestion of 100 mg. of nicotinamide at the beginning of the 4th day's urine collection. On the 5th, 6th, and 7th days no urine was collected. On the 7th to 11th days 1 g. of methionine was ingested orally every 12 hours. Urinary nicotinamide methochloride elimination was investigated in 24-hour samples on the 8th to 11th days; no extradietary nicotinamide was administered on the 7th to 9th days, and 100 mg. of nicotinamide was taken by mouth on the 10th day. The experiment was spread over the second half of 1945. All persons continued with their usual work and had their usual food during the experiment.

Experiment 2.—On 5 physically fit inmates of West Park Hospital—1 male and 4 females (Nos. 7-11). The urinary elimination of nicotinamide methochloride was estimated for 14 days—the first 3 days without extradietary administration of nicotinamide, the remaining 11 days after daily ingestion of 100 mg. of nicotinamide at the beginning of the collection period. In addition, 1 g. of methionine was ingested by mouth every 12 hours on the 9th, 10th, and 11th days. The experiment was carried out between March 14 and 31, 1945. All persons in this and the following experiments received the usual hospital diet and were kept in bed or indoors during the experiment.

Experiment 3.—On 8 inmates of West Park Hospital—1 male and 7 females (Nos. 12–19). Four of these were physically fit, one was a physically fit woman who had suffered from pellagra in recent years, and three were pellagrins. The only differences from Experiment 2 were that every second subject was given the daily 100 mg. nicotinamide subcutaneously instead of orally during the whole experiment, while the other half received it by mouth as all subjects in Experiment 2, and the nicotinamide methochloride estimation was continued for one (15th) day after the nicotinamide administration came to an end. The experiment was carried out from April 30 to May 23, 1945.

Experiment 4.—On 5 physically fit and 3 pellagrous female inmates of West Park Hospital (Nos. 20–27). The arrangements in this experiment differ from those of Experiments 2 and 3 in that nicotinamide was administered throughout the experiment to all persons subcutaneously instead of orally, and that 500 mg. (250 mg. twice daily) were given instead of 100 mg. for all 11 days. Urinary nicotinamide methochloride elimination was measured for 15 days, as in Experiment 3. The experiment was carried out between July 10 and 25, 1945.

Experiment 5.—On 9 inmates of West Park Hospital—3 males and 6 females (Nos. 28–36). Six of these were physically fit

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† Since this paper was submitted for publication experiments have been carried out showing that experimental liver poisoning in rats causes, after a preliminary rise in nicotinamide methochloride output due to tissue disintegration, a diminished spontaneous nicotinamide methochloride elimination in urine and a diminished response to dosed nicotinamide. Evidence has been obtained also for the elimination of nicotinamide methochloride in the bile and the destruction of the compound by intestinal bacteria *in vitro* (Ellinger, 1947).

and three were mild acute or chronic pellagrins. The urinary nicotinamide methochloride eliminations were measured for 15 days. After three days without extradietary nicotinamide administration 100 mg. of nicotinamide was given to each person at the beginning of the 4th, 7th, 10th, and 13th days of the collecting period, alternatively subcutaneously, orally, or rectally. Three people commenced with subcutaneous, three with oral, and three with rectal administration, and at the end of the course (13th day) ingestion by the first route was repeated; thus each person received ingestion by one route twice and by the other routes once. The experiment was carried out between Oct. 28 and Dec. 4, 1945.

On some occasions the same person was used for more than one experiment; these were Nos. 7, 12 (2); 8, 13 (4); 10, 14 (6); 9, 15, 22, 30 (5). Some of them had already been examined in the experiments reported by Ellinger, Benesch, and Hardwick (1945). The figures in brackets indicate their numbers in that paper. In all cases collection of urine was done in the same way as described by those authors. The daily urinary nicotinamide methochloride output was measured by the method of Coulson, Ellinger, and Holden (1944).

Results

The results of Experiments 1–5 are shown in Tables I–V respectively. In all tables the pre- and post-dosing elimination of nicotinamide methochloride is presented in mg. per day, while the response to ingested nicotinamide—that is, the recovery of nicotinamide—is given as percentage of the ingested nicotinamide. This is calculated by deduction of the daily pre-dosing average elimination of nicotinamide methochloride in mg. from the elimination in mg. during 24 hours after dosing nicotinamide. This difference is multiplied by 100 and the molar weight of nicotinamide, and divided by the mg. of nicotinamide dosed and the molar weight of nicotinamide methochloride. In Table V the recovery for 72 hours after dosing nicotinamide is found by deducting three times the daily pre-dosing average elimination in mg. from the sum in mg. of the daily elimination in mg. for three days following the administration of nicotinamide. The difference is multiplied as before by 100 and the molar weight of nicotinamide, and divided by the weight in mg. of the administered nicotinamide and the molar weight of nicotinamide methochloride.

Discussion

Experiments 1 to 4 (Tables I to IV) should be discussed simultaneously. The pre-dosing nicotinamide elimination of those people who have been examined more than once is remarkably constant over a fairly long period; only the values for the January experiment (Ellinger, Benesch, and Hardwick, 1945) were considerably higher in three instances. In one case—(6) 10, 14—the output varied considerably and was lower in January than on the later occasions. The pre-dosing nicotinamide methochloride elimination was in all instances considerably lower in the pellagrins than in physically fit persons.

The response to a five-day course of 100 mg. of nicotinamide was less constant in the fit persons examined more than once, but always much above that of the pellagrins. The response to a daily intake of 500 mg. of nicotinamide was not only absolutely but also relatively considerably above that to a daily intake of 100 mg. The relative response to 500 mg. was even more increased in pellagrins than in fit persons, so that the difference between pellagrins and non-pellagrins was far less distinct than after the intake of 100 mg. A test with 100 mg. of nicotinamide therefore provides a more significant result than one with 500 mg.

So far there has not been much evidence that the presence or absence of "methyl-donators" might influence the extent of nicotinamide methylation and consequently control the height of urinary nicotinamide methochloride elimination. Perlzweig, Bernheim, and Bernheim (1943) observed that in some cases the addition of methionine increased the formation by rat-liver slides of nicotinamide methochloride from nicotinamide. In confirming these results Ellinger (1946a) found that methionine increases the methylation of nicotinamide by slices of liver of those rats

TABLE I.—*Daily Urinary Elimination of Nicotinamide Methochloride (NM) and Response to Orally Dosed 100 mg. Nicotinamide (NA) Before and During Daily Oral Ingestion of 2 g. of Methionine*

No.	Date	Sex	Age	Condition of Health	Daily NM Elimination on Pre-dosing Days (mg.)				Recovery* of NA in % of Ingested 100 mg. NA	Daily NM Elimination during Methionine Dosing (mg.)				Recovery* of NA (as NM) in % of 100 mg. Ingested NA during Methionine Dosing
					1	2	3	Aver.		1	2	3	Aver.	
1	16–26/7	F.	20	Fit	6·2	6·8	5·7	6·2	10·2	5·8	6·6	6·3	6·2	11·2
2	15–25/8	F.	52	Fit	5·3	6·0	5·7	5·7	11·7	5·0	5·7	6·0	5·6	10·7
3	3–13/9	M.	58	Diab.	3·8	4·1	3·7	3·9	6·2	3·4	3·7	3·3	3·5	5·2
4	17–27/9	M.	26	Fit	8·2	8·9	9·1	8·7	12·7	8·4	8·9	9·2	8·8	13·5
5	1–11/10	F.	24	Fit	3·6	3·4	3·9	3·6	10·8	3·9	4·2	4·4	4·2	8·9
6	5–15/11	M.	32	Fit	7·3	7·9	8·2	7·8	15·8	6·8	7·2	7·3	7·1	14·9
				Average:	5·7	6·2	6·1	6·0	11·2	5·6	6·1	6·1	5·9	10·7

$$*\frac{\text{Urinary NM in mg.} - \text{pre-dosing NM average in mg.}}{\text{dosed NA in mg.}} \times \frac{\text{mol.W. of NA}}{\text{mol.W. of NM}} \times 100$$

TABLE II.—*Response of Physically Fit Persons to Oral Application of 100 mg. of NA Before, During, and After Daily Oral Dosage of 2 g. of Methionine (March 14–31, 1945)*

No.	Sex	Age	Weight		NM Elimination in mg. on Pre-dosing Days				Recovery of NA (as NM) in % of Ingested NA*													
									On 100 mg. NA Dosing Days						On 100 mg. NA–2 g. Methionine Dosing Days				On 100 mg. NA Dosing Days			
			lb.	kg.	1	2	3	Aver.	1	2	3	4	5	Aver.	1	2	3	Aver.	1	2	3	Aver.
7	M.	34	214	97·2	5·20	—	5·07	5·14	—	14·2	17·1	17·3	17·7	16·6	14·2	13·8	11·1	13·0	11·4	42·6	72·5	42·8
8	F.	40	122	55·3	4·75	5·26	5·09	5·03	9·8	12·4	14·3	13·8	15·6	13·2	12·9	6·1	58·2	25·7	52·8	82·4	85·9	73·7
9	F.	23	142½	64·8	5·14	—	3·18	4·16	6·7	14·9	14·6	8·3	7·3	10·2	9·8	8·6	77·6	32·0	73·0	28·5	38·2	46·6
10	F.	54	136	61·8	3·95	4·56	4·58	4·36	11·5	16·4	17·5	28·5	12·5	17·3	12·0	12·8	76·8	33·9	119·0	32·9	71·4	74·4
11	F.	34	85	38·6	—	4·28	—	4·28	7·3	12·8	7·3	11·4	11·3	10·0	1·9	7·2	4·7	4·6	0·9	39·7	25·2	21·9
				Average:	4·76	4·70	4·48	4·62	8·8	14·7	14·2	15·7	12·9	13·5	10·1	9·9	45·7	21·9	51·4	45·1	58·6	52·1

* See note under Table I.

TABLE III.—*Response of Physically Fit Persons and Mild Pellagrins to Oral or Subcutaneous Application of 100 mg. of NA Before, During, and After Daily Dosage of 2 g. of Methionine (April 30 to May 23, 1945)*

No.	Sex	Age	Weight lb.	Weight kg.	Way of Admin.	Clinical Diagnosis	NM Elimination in mg. on Pre-dosing Days 1	2	3	Aver.	Recovery of NA (as NM) in % of Ingested NA* On 100 mg. NA Dosing Days 1	2	3	4	5	Aver.	On 100 mg. NA–2 g. Methionine Dosing Days 1	2	3	Aver.	On 100 mg. NA Dosing Days 1	2	3	Aver.	NM Elimination in mg. on Post-dosing Day 1
12	M.	34	214	97·2	Oral	Physically fit	5·56	6·65	4·96	5·72	10·9	12·5	7·6	5·0	8·8	9·0	6·9	15·5	13·6	12·0	10·9	13·9	16·6	13·8	10·6
13	F.	40	122	55·5	,,	,, ,,	4·80	6·20	4·64	5·21	10·6	9·2	11·1	13·8	17·0	12·3 } 10·7	17·2	11·4	2·8	10·6 } 11·8	11·4	14·3	26·8	19·5 } 16·7	7·2 } 8·9
14	F.	54	134	60·9	Sub-cutaneous	,, ,,	7·28	6·95	7·60	7·21	3·8	23·5	11·3	22·0	19·4	16·0 } 15·3	18·7	19·6	23·1	20·5 } 18·2	17·7	6·5	27·2	17·1 } 18·7	29·6
15	F.	23	142½	64·8	,,	,, ,,	4·17	4·44	4·15	4·25	13·3	12·9	11·5	17·3	17·3	14·5 }	14·0	13·5	19·3	15·8 }	18·8	20·3	21·8	20·3 }	—
						Normal controls; average:	5·36	6·01	5·28	5·50	9·7	14·5	10·3	14·5	15·6	13·0	14·3	15·0	14·7	14·7	14·7	13·7	23·0	17·1	15·8
16	F.	55	144	65·5	Sub-cutaneous	Physically fit at the time; pellagra in recent years	2·26	3·14	2·81	2·74	11·0	5·7	8·5	10·9	12·1	9·6	10·1	13·6	20·0	14·5	7·8	14·8	9·6	10·7	11·6
17	F.	53	100	45·4	Oral	Mild pellagra	0·55	0·75	0·51	0·60	3·9	4·4	7·4	5·9	4·4	5·2 } 5·1	12·7	6·7	5·5	8·3 } 8·4	6·4	9·9	8·9	8·3 } 11·6	11·2 } 10·1
18	F.	47	125	56·8	,,	,, ,,	0·07	0·90	0·34	0·44	5·4	4·7	2·7	6·3	4·3	4·9 }	8·3	9·0	8·1	8·5 }	11·2	10·6	22·6	14·9 }	9·0 }
19	F.	45	86	39·0	Sub-cutaneous	Chronic pellagrin with recent relapses	0·39	0·0	0·35	0·25	7·7	2·8	4·6	4·3	3·1	4·5	8·7	7·9	9·9	8·9	5·3	9·6	6·1	7·0	7·3
						Pellagrins; average:	0·33	0·55	0·40	0·45	5·7	4·0	4·9	5·5	3·9	4·8	9·9	7·9	7·8	8·5	7·6	10·0	12·5	10·0	9·2

*$\frac{\text{Urinary NM in mg.} - \text{pre-dosing NM average in mg.}}{\text{dosed NA in mg.}} \times \frac{\text{mol.W. of NA}}{\text{mol.W. of NM}} \times 100$

TABLE IV.—*Response of Physically Fit Persons and Pellagrins to Subcutaneous Application of 500 mg. of NA Before, During, and After Daily Oral Dosage of 2 g. of Methionine (July 10 to 25, 1945)*

No.	Sex	Age	Weight lb.	Weight kg.	Clinical Diagnosis	NM Elimination in mg. on Pre-dosing Days 1	2	3	Aver.	Recovery of NA as (NM) in % of Ingested NA* On 500 mg. NA Dosing Days 1	2	3	4	5	Aver.	On 500 mg. NA–2 g. Methionine Dosing Days 1	2	3	Aver.	On 500 mg. NA Dosing Days 1	2	3	Aver.	NM Elimination in mg. on Post-dosing Day
20	F.	44	158	71·8	Physically fit	4·74	4·36	3·83	4·31	7·8	16·6	22·2	16·9	13·5	15·4	22·2	26·4	20·7	23·1	21·5	—	26·0	23·8	16·2
21	F.	56	186	84·5	,, ,,	7·25	6·02	5·45	6·24	6·7	18·1	20·6	22·4	17·6	17·1	28·5	49·6	31·8	36·6	25·5	18·7	24·8	25·2	24·2
22	F.	23	139	63·2	,, ,,	4·60	4·48	4·16	4·41	8·9	19·1	25·1	19·5	21·4	18·4	32·8	26·0	20·4	26·4	29·8	—	31·0	30·4	21·7
23	F.	23	166	75·5	,, ,,	5·52	4·85	4·89	5·09	6·1	21·6	21·0	21·3	23·5	18·7	37·6	25·7	20·8	28·0	24·6	—	17·8	21·2	20·4
24	F.	34	89	40·5	Malnutrition	4·78	4·20	5·54	4·83	6·0	20·3	24·7	25·4	27·2	20·7	37·6	41·9	39·6	29·6	14·4	19·4	27·2	20·3	28·4
					Normal controls; average:	5·38	4·78	4·77	4·98	7·1	19·1	22·7	21·1	20·6	18·1	31·7	33·9	26·7	30·8	23·2	19·1	25·4	24·2	22·2
25	F.	67	85	38·6	Acute pellagra	1·29	—	1·33	1·31	7·4	18·2	14·1	17·4	14·8	14·4	22·6	26·5	27·2	25·4	23·9	—	—	23·9	35·7
26	F.	44	67½	30·7	Chronic ,,	2·12	1·66	1·67	1·82	5·2	18·0	18·8	—	20·3	15·0	30·8	19·1	12·3	20·1	11·0	16·0	23·1	16·7	23·4
27	F.	43	122½	55·7	Recurrence of pellagra—mild	1·48	1·25	1·04	1·26	3·4	9·9	16·1	16·8	15·3	12·3	41·9	25·6	18·5	28·7	15·2	14·0	20·7	16·6	13·3
					Pellagrins: average:	1·63	1·46	1·35	1·47	5·3	15·4	16·3	17·1	16·8	14·1	31·8	23·1	19·3	24·7	16·7	15·0	21·9	16·7	24·1

* See note under Table III.

TABLE V.—*Recovery from Urine of NA (Eliminated as NM) after Dosing with 100 mg. of NA by Various Routes (Oct. 28 to Dec. 4, 1945)*

No.	Sex	Age	Weight lb.	Weight kg.	Condition of Health	24 hrs. NM Elimination Pre-dosing Average in mg.	Recovered NA (as NM) in % of Dosed NA* During a 24-hr. Period after Dosing Subcutaneous	Oral	Rectal	During a 72-hr. Period after Dosing Subcutaneous	Oral	Rectal	24 hrs. NM Elimination Post-dosing Average in mg.
28	F.	32	128½	58·4	Fit (Wassermann +)	8·09	8·38	8·26	(7·70; 6·98) **7·34***	8·38	8·26	(7·70; 6·98) **7·34**	7·67
29	M.	40	164	74·5	Fit	5·96	8·46	(9·90; 8·90) **9·40**	1·92†	8·46	(10·99; 8·90) **9·95**	3·04	5·67
30	F.	23	138	62·8	,,	4·82	(6·85; 8·13) **7·49**	6·50	7·39	(8·93; 8·55) **8·74**	8·60	7·39	4·10
31	M.	31	153	70·0	,,	3·50	(9·79; 8·80) **9·30**	7·68	7·49	(9·79; 10·52) 10·16	12·32	7·81	4·17
32	M.	34	129	58·7	,,	2·46	12·62	(7·26; 9·79) **8·53**	9·82	16·94	(7·75; 12·59) **10·17**	12·04	3·74
33	F.	23	164	74·5	,,	2·34	19·58	7·50	(6·06; 12·62) **9·34**	24·83	10·30	(6·66; 18·71) **12·69**	5·90
34	F.	54	103	46·8	Mild pellagra	1·79	(5·68; 2·98) **4·33**	0·40	4·27	5·68; 5·46) **5·57**	5·82	5·26	2·37
35	F.	34	84	38·2	Malnourished and mild pellagra	1·31	11·15	4·66	(4·23; 2·18) **3·21**	15·89	8·39	(5·60; 6·78) **6·19**	3·98
36	F.	55	113	51·4	Mild recurrent pellagra. Low food intake	0·62	7·14	(2·16; 4·82) **3·49**	2·44	8·95	(2·16; 6·12) **4·14**	2·87	1·28

* See note under Table III.
† A control rectal dosage with 100 mg. of NA revealed 1·49% recovery in 24 and 72 hours. The figures in black indicate the average of the results of two separate experiments carried out as first and last dosing experiments on each subject. The subjects are in order of their average pre-dosing NM elimination.

which had had a low nicotinamide elimination *in vivo*, and had low methylating efficiency *in vitro*. No systematic investigation of the effect of methionine on the urinary nicotinamide elimination by man has so far been carried out.

The limited number of experiments on physically fit persons and one diabetic provide identical results (Table I). No significant change of the daily nicotinamide methochloride output could be observed during a four-day period of oral intake of 2 g. of methionine. No significant quantitative alteration was seen in the response to 100 mg. of nicotinamide; this in spite of the fact that the second nicotinamide ingestion was made on the fourth day of methionine feeding. This was done to avoid a nicotinamide test during the refractory period, which was observed after methionine intake in some of the other experiments. Unfortunately no pellagrins suited to the experiment were available. The results are, however, so homogeneous that one can conclude that in physically fit people methionine is not a limiting factor for the height of the daily urinary elimination of nicotinamide methochloride or for the response to single doses of 100 mg. nicotinamide.

Experiments 2, 3, and 4, described in Tables II, III, and IV, were designed to exhaust, if possible, the body stores of "methyl-donators" by protracted ingestion of nicotinamide. The results vary individually and in the same person at different times to a considerable extent. In the March experiment (Table II) the ingestion of methionine depressed the response very considerably in No. 11 and moderately in No. 7 and for the first two days in Nos. 8, 9, and 10. In the latter three a considerable rise of the response occurred on the third day of methionine intake, which continued for the rest of the nicotinamide intake after discontinuing methionine; on the first of these days the output of No. 10 was even higher than the intake, which suggests the storage of nicotinamide. In Nos. 7 and 11 an increase occurred only on the second day after the end of methionine feeding.

In the May experiment (Table III) the results on the physically fit people were similar; the extent of the increase was somewhat less high than in the March experiment. In 3 pellagrins (Nos. 17, 18, and 19), however, a moderate rise of the response started immediately when methionine intake began and continued over the whole period of further nicotinamide intake. The response of the person who had had attacks of pellagra in recent years (No. 16) was intermediate between the fit persons and the pellagrins. It could be expected that an exhaustion of the body from "methyl-donators" would be more pronounced after the daily intake over a longer period of 500 mg. instead of 100 mg. of nicotinamide.

In 5 physically fit persons (Table IV) the intake of methionine caused already on the first day a considerable increase of the response, which continued to a lesser degree after discontinuing the methionine. The pellagrins, particularly No. 27, increased their response to nicotinamide considerably, and differences between pellagrins and non-pellagrins disappeared almost completely. This might be due to the pellagra-curing effect of a dosage 500 mg. of nicotinamide for 5 days before the first methionine intake.

To summarize: from Experiments 2, 3, and 4 (Tables II to IV) it is evident that methionine increases the response to ingested nicotinamide if relatively large doses of nicotinamide are ingested for a longer period. The effect is far more pronounced after the daily intake of 500 mg. than after that of 100 mg. In a nicotinamide-saturation test such as that recommended by Ellinger, Benesch, and Hardwick (1945) with a daily intake for a period of 5 days of 100 mg. of nicotinamide, the height of the nicotinamide methochloride output might already have been affected by an exhaustion of "methyl-donators."

The most surprising result was the observation of a latent period in the action of methionine of up to 4 days in Nos. 7 and 11. An explanation of this phenomenon cannot be given. The oppression of the response to nicotinamide during the first days of methionine dosage suggests perhaps a blocking of the methylating mechanism of the liver.

The development of a nicotinamide deficiency is caused, apart from increased consumption effected by excessive exercise, etc., by insufficient nicotinamide intake from the diet or from the release of the intestinal flora. This can be due to malabsorption or to insufficient production or increased consumption or destruction of nicotinamide by the intestinal flora. Experiment 5 was designed to elucidate this point and to obtain more evidence about the response to nicotinamide when administered by various routes. From the investigation of Ellinger and Coulson (1944) it was known that orally ingested nicotinamide appeared in its methylated form in the urine of physically fit persons a few minutes after its ingestion; that after the intake of 100 mg. the elimination peak was reached in about 2 hours; and that the elimination was practically finished after 15 hours. This showed that methylation and absorption were very quick processes and that probably a considerable proportion of the orally ingested nicotinamide had been absorbed from the stomach. Consequently it could be expected that orally and parenterally ingested nicotinamide should give a similar response. It was, however, known from the paper by Ellinger and Coulson (1944) that orally ingested nicotinamide methochloride could be recovered only to a small extent—12–16%—while 62% was recovered after parenteral administration; findings confirmed by Perlzweig and Huff (1946). It was further known that in pellagrins but not in healthy persons the response to nicotinamide is frequently lower after oral than after parenteral application (Ellinger, Benesch, and Kay, 1945). Nothing was known about the fate of nicotinamide given per rectum. Prescott (1945) even doubts, without any evidence, that nicotinamide can be absorbed from the colon. The results shown in Table V provide a great variety of facts which have to be discussed.

1. In most of the 9 cases considered the elimination of the ingested nicotinamide in its methylated form is not finished 24 hours after the ingestion. The difference between 24-hour and 72-hour recovery after parenteral dosage is insignificant or absent on 4, slight on 3, and considerable on 5 occasions; after oral intake the difference is insignificant or absent on 3, slight on 3, and considerable on 6 occasions; after rectal intake the difference is insignificant or absent on 3, slight on 6, and considerable on 3 occasions. Only the considerable differences will be taken into account. If, as is the case with Nos. 32, 33, and 35, a considerable proportion of the recovered nicotinamide methochloride is eliminated later than 24 hours after ingestion independently of the route of application, one has to conclude that this is caused by a common factor other than the uptake from the intestines and either that the methylation or the elimination is slow or that part of the ingested nicotinamide is stored temporarily in the body. If, however, a large difference between the 24-hour and the 72-hour recovery is limited to the nicotinamide intake by one route, the mouth (cases Nos. 30, 31, and particularly 34), one has to conclude an interference with the nicotinamide uptake from the intestines. There was no large isolated nicotinamide methochloride elimination after the first 24 hours following rectal application.

2. Total response to parenteral and oral application was almost identical in 4 fit persons (Nos. 28, 29, 30, and 31), and in 1 pellagrin (No. 34). In 2 fit persons (Nos. 32 and 33) and 2 pellagrins (Nos. 35 and 36) nicotinamide methochloride elimination was far higher after parenteral than after oral ingestion; this indicates an interference with the dosed nicotinamide during its passage through the intestines. It might

be due to malabsorption: this is, however, improbable, since none of these cases showed a delayed elimination after oral ingestion alone. It is more probable that part of the ingested nicotinamide is either consumed or destroyed by the intestinal flora; this assumption is supported by the fact that in all these 4 cases the response to rectal is also much lower than to parenteral administration. In 2 cases (Nos. 29 and 31) the response to oral was somewhat higher than to parenteral dosage. This might have been due either to individual fluctuation or to an effect of the previous dosage with nicotinamide during the experiment.

3. In order to find out whether the repeated intake of nicotinamide altered the nicotinamide state of the body and therefore the extent of the response, at the end of each experiment a test was made with nicotinamide dosage by the route used at the beginning of the experiment. Considerable rises in response, such as in Nos. 32, 33, and 36, indicate an improved nicotinamide state in consequence of the repeated nicotinamide ingestions; this is confirmed by the considerably increased daily spontaneous elimination of nicotinamide methochloride in these 3 cases at the end compared with that at the beginning of the experiment. This factor has to be considered when the intermediate responses are valued.

4. In all cases a response was observed to rectally ingested nicotinamide. There can therefore be no doubt about the absorption of nicotinamide from the lower intestines. In most cases (Nos. 28, 30, 34, and 35) the response was somewhat but not much lower than that to oral ingestion. In 2 cases (Nos. 32 and 33) it was higher than that to oral dosage, and in both these cases there was a considerable rise of the nicotinamide state and response; and this explains the fact. In 3 cases (Nos. 31, 36, and particularly 29) the response to rectally ingested was considerably lower than that to orally ingested nicotinamide. This indicates bacterial consumption or destruction, since the whole ingested dose comes in contact with the intestinal flora when rectally applied, while most of the orally ingested nicotinamide is probably absorbed before it reaches the lower intestine and its flora.

Unfortunately it was impossible to obtain for the test more than three cases of pellagra, and all three were very mild cases. Nevertheless they gave a considerably lower response to orally ingested nicotinamide after 24 hours—3.28 mg.—as well as after 72 hours—5.35 mg.—than the physically fit persons—8.18 and 9.96 mg. respectively; and that is the only route which counts for the utilization of dietary and bacterial nicotinamide. From comparing the various values one can conclude that in Case 34, with very much delayed absorption and low response, the nicotinamide state is very low owing to malabsorption. In Case 35, with a delayed elimination after application by all three routes, the methylating mechanism might be faulty and the bacterial supply low on account of the low pre-dosing values and the considerable rise during the experiment. In Case 36, with its low oral response and small delay in elimination, pellagra might be caused mainly by insufficient bacterial supply. In Cases 32 and 33 the difference in response to parenteral and oral intake is considerable and the intestinal destruction of nicotinamide is great; the release of nicotinamide in the intestines must, however, be even higher than the destruction shown by the very high response to the parenteral application. Cases 28 to 31 show no peculiarities except perhaps for the low response of Case 29 to rectally applied nicotinamide. This, however, does not interfere with the normal nicotinamide uptake.

It is still impossible to obtain a complete balance of ingested nicotinamide in man. Small amounts are eliminated in the urine as such, more (between 2.87 and 24.83%) in our last experiment as nicotinamide methochloride. The rest cannot be accounted for. Of parenterally ingested nicotinamide methochloride only about 60% can be recovered. Perlzweig and Huff (1946) and Perlzweig, Huff, and Rosen (1946) believe that part of the nicotinamide methochloride is split up in the liver to unknown products, and Najjar and Deal (1946) believe in a partial demethylation of nicotinamide methochloride in the liver. Both suggestions are improbable, since Ellinger (1947) could show that rat-liver slices do not destroy nicotinamide methochloride *in vitro*. It is more probable that a portion of the nicotinamide methochloride formed in the liver is eliminated with the bile into the intestine and there destroyed by the intestinal flora like the substance ingested by mouth.* This point cannot be elucidated by our method, but evidence can be obtained of a number of other factors concerned with state, uptake, and utilization of nicotinamide, and this might help to find the cause of a nicotinamide deficiency that might be different in each individual case.

The experiments show that the saturation test as described by Ellinger, Benesch, and Hardwick might be affected by an exhaustion of the "methyl-donators" of the body and therefore not provide a true picture of the nicotinamide state. It might be further affected by factors of the intestinal tract not connected with the nicotinamide state. Parenteral instead of oral application of the test doses would avoid the latter error.

A more satisfactory test, providing more detailed information about a variety of factors concerned with the state and utilization of nicotinamide, can be obtained by the following method: 24-hour urine samples are collected and the urinary nicotinamide methochloride is estimated for 18 days; immediately after the 3rd, 6th, 9th, and 12th collections 100 mg. of nicotinamide is administered—subcutaneously on the first and last, orally on the second, and rectally on the third occasion. The recovery percentage of the ingested nicotinamide is calculated for a 24-hour and a 72-hour period and the values obtained are analysed as in these experiments.

Summary

Evidence has been provided that lack of "methyl-donators" may affect the results of a nicotinamide-saturation test.

A new nicotinamide-saturation test has been described which avoids this error and supplies separate information about the nicotinamide state and the various factors involved in uptake from the gut and utilization of nicotinamide.

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* Cf. footnote page 672.

TUBERCULOSIS AS A COMPLICATION OF DIABETES MELLITUS

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During the nineteenth century, when the incidence of and the mortality from pulmonary tuberculosis were much greater than at present, a large percentage of sufferers from diabetes mellitus died of coma, and most of those who survived this died of pulmonary tuberculosis. Publications towards the end of that century indicate that 50% of diabetics succumbed to pulmonary tuberculosis. For example, Windle (1883) reported that of 333 diabetic cases coming to necropsy half had active tuberculous lesions. Naunyn (1906) found pulmonary tuberculosis in 264 out of 622 diabetics at necropsy. Despite the passage of the years, and even after the advent of insulin in the treatment of diabetes, the incidence of tuberculosis in cases of diabetes mellitus has remained significantly high. This was shown by Banyai (1931), who concluded from the available literature that pulmonary tuberculosis was three times commoner in patients suffering from diabetes mellitus than in the general population. These observations were confirmed by Root (1934) when he investigated the incidence of tuberculosis in 1,651 cases of diabetes. The frequent combination of these two diseases is, then, an accepted fact.

Root (1934) maintains that, despite the decline in the mortality from pulmonary tuberculosis in the general population, the morbidity from tuberculosis among diabetic patients is steadily increasing. This would indicate that the longer the patient has diabetes the greater is the possibility that he will ultimately develop tuberculosis. In view of this, and on account of an apparent increase in the incidence of pulmonary tuberculosis among patients attending a diabetic clinic, it was considered important to review the subject in more detail locally.

Review of a Series of Cases

This paper describes 17 cases of diabetes mellitus and tuberculosis encountered during the supervision of 717 patients suffering from diabetes over the period 1932–46. Among these were 60 deaths—11 from pulmonary tuberculosis after 1936, with eight such deaths during the war years. A review in 1945 showed that of 657 patients alive at that time 239 were males and 418 females; 12 were under 15 years and 236 between 15 and 45 years of age; and 387 were under insulin treatment. The cases considered here are summarized in Table I.

In all cases the patients were definitely diabetic, and the diagnosis of tuberculosis was verified by isolation of the tubercle bacillus. In 11 cases the diabetes preceded the onset of tuberculosis by periods of up to 13 years, while in the other six cases the diagnoses were made simultaneously. Fourteen patients were males and three females. The diabetic condition was detected on an average at 40.18 years of age, and the tuberculosis at 44.23 years. In the greater percentage of cases the tuberculosis made its appearance in the fifth decade, whereas the majority of cases of tuberculosis in the general population occur in the second or third decade. This suggests that tuberculosis developed on account of pre-existent diabetes mellitus. That tuberculosis is a complication of severe diabetes will be seen from Table II. These observations agree with those of Himsworth (1938). Only those cases in which the diabetes preceded the tuberculosis have been used in compiling these figures.

TABLE I

Case No.	Sex	D.M. Diag. Age	D.M. Diag. Date	Control of D.M.	Tb. Diag. Age	Tb. Diag. Date	Stage of Tuberculosis	Signs Suggesting Tb.	Remarks
1	F.	33	1933	Fairly good	46	5/46	Fibro-caseous bilateral apical	Nil	Died of coronary thrombosis at 46
2	M.	43	8/43	Poor	44	5/44	Infiltrative L. apex	Yes	Died 7/45
3	M.	17	11/32	,,	26	5/41	Infiltrative with cavity R. apex—extensive	,,	Died 4/42
4	M.	32	6/35	Fairly good	35	2/38	Tb. meningitis	,,	Died 15 days after diagnosis
5	M.	39	7/43	Fair only	42	5/46	Extensive filtration L.	,,	Condition improving. Diabetes under control
6	M.	12	1935	Repeated comas	20	12/43	Fibro-caseous, with cavitation L. apex. Infiltration R.	,,	Died 4/44. Bronchopneumonic spread
7	M.	63	8/41	—	63	8/41	Fibro-caseous bilateral apical	,,	Died 2/44. Bronchopneumonic spread
8	M.	51	5/39	? Good	55	9/43	Fibro-caseous bilateral, with cavitation	,,	Died of pulmonary embolism from phlebothrombosis L. leg 9/43
9	M.	48	1938	Fair only	55	2/45	Fibro-caseous bilateral, with cavitation	,,	Condition improving. Diabetes under good control
10	M.	29	7/33	Fairly good	41	1/45	Infiltration apical L., with cavitation	Nil	Patient died 9/46. Coronary thrombosis. Chest condition improving
11	M.	65	8/39	—	65	8/39	Fibro-caseous with cavitation—L.	Yes	Died 12/40
12	F.	46	4/45	—	46	4/45	Infiltration apical R., with cavity L.	,,	Condition improving. Diabetes under good control
13	M.	40	12/37	Unknown	46	4/43	Fibro-caseous bilateral, extensive, with cavitation	,,	Condition improving. Diabetes under good control
14	F.	41	10/36	—	41	10/36	Bilateral fibro-caseous, with bronchopneumonia	,,	Died 11/36
15	M.	37	1928	Unknown	39	4/30	Bilateral infiltration	,,	Fairly well
16	M.	48	1/33	—	48	1/33	Infiltration with cavitation R.U. and M. lobes	,,	Under good control
17	M.	39	10/36	Fair only	40	11/37	Tb. bronchopneumonia R. lung	,,	Died 12/37. Skiagram of chest 10/36 showed no abnormality

TABLE II

	Cases
Mild, requiring less than 20 units of insulin daily	2
Moderate, requiring 20–40 units of insulin daily	1
Severe, requiring over 40 units of insulin daily	8

All except two patients had symptoms suggestive of tuberculosis some months before the verification of the presence of a tuberculous lesion. Most of those complained of productive cough with loss of weight. Many gave a history of recurrent colds, or perhaps of a head cold which was persistent. Physical signs of pulmonary tuberculosis were present in 14 of the cases at the time of diagnosis.

Table III shows an analysis of the extent of the tuberculous process when first diagnosed and the course of the disease in these cases. The most striking feature is the number of patients with the disease already far advanced at the time of diagnosis. There are several possible reasons for this. The patients were almost without exception under poor or uncertain control, accounting possibly for their greater susceptibility, and also perhaps for the rapid spread

of the disease. The majority of the affected cases were most irregular attenders, and adequate checking was almost impossible. The early symptoms of tuberculosis simulate those of diabetes so that errors in diagnosis are easy. And, finally, of course, the physical signs of pulmonary tuberculosis are seldom more than minimal until the disease is well advanced. In six patients the pulmonary disease remains arrested. In point of fact, seven are shown as arrested in Table III, but of these one died of coronary thrombosis.

TABLE III.—*(Excluding the Patient who died from Tuberculous Meningitis)*

	Unilateral		Bilateral		Total
	Without Cavitation	With Cavitation	Without Cavitation	With Cavitation	
Cases ..	2, 5	3 (A.P. failed), 10, 11, 16, 17	7, 15	1, 6, 8, 9, 12 (A.P. failed), 13, 14 (A.P.–Tb. empyema)	16
Stationary, arrested	5	10, 16	15	9, 12, 13	7
Progressive	—	11, 17	3	2 (A.P. failed), 6, 7, 14	7
Death ..	—	10 (died coronary thrombosis), 11, 17	3	1 (died coronary thrombosis), 2, 6, 7, 8, 14	10

Discussion

The patient under poor diabetic control is more prone to the complication of tuberculosis. Root (1940) showed that patients who have suffered from coma are the most likely to develop pulmonary tuberculosis. Moreover, he has shown that patients on a free diet yield a far greater percentage of tuberculosis than those subject to careful dieting. It should be remembered, however, that the patients on free diet are on the whole less well-off economically. Consequently, this introduces an environmental element which renders direct comparison between the two groups an unjustifiable procedure. Conversely, Himsworth (1938) in a series of 300 diabetics under good control found that only two developed tuberculosis. These facts are largely borne out in the present series of cases. On the experimental side Steinbach and his colleagues (1935) have produced some evidence to show that dogs rendered diabetic by removal of the pancreas were less resistant to a known dose of tubercle bacilli than a control group of healthy animals. This suggests that the increased susceptibility of the diabetic dogs to the tubercle bacillus may be due to faulty carbohydrate metabolism.

This fact forms the basis of the most frequently accepted hypothesis, which is that hyperglycaemia favours the growth of the tubercle bacillus in the body. Joslin and others (1940) stated that this is due to the hyperglycaemia impairing the normal reparative tissue processes and the resistance to infection—statements which are not accorded universal agreement (Richardson, 1933, 1935). Long (1930) suggested that the primary cause was an upset in fat metabolism with an increased availability of glycerin, which, of course, is one of the best nutrients for acid-fast organisms.

The fact that diabetic coma often leads to the appearance of pulmonary tuberculosis or a flare-up of an already existing lesion is thought to be partly attributable to an over-supply of nitrogenous compounds which favour the growth of tubercle bacilli. In this connexion Keeton (1941) brought forward the suggestion that tissue resistance is lowered by acidosis, and Smithburn (1935) demonstrated experimentally that the virulence of the tubercle bacillus is increased by increasing the acidity of the culture. Furthermore, Root (1934) emphasized the possible importance of the reticulo-endothelial system. In poorly controlled diabetics the cells of this system are often found to be distended with fat, and it is recognized that any interference with these cells causes a decrease in the defence and resistance of the body.

There is another possible factor which has found much favour in recent American literature. It is well known that deficiency of vitamin A leads to specific changes in the mucosa of the respiratory system characterized by atrophy of the epithelium with associated disappearance of the ciliary function, proliferation of the basal cells, and replacement of the original epithelium by stratified keratinizing epithelium. That vitamin A deficiency exists in diabetes has been reported by Brazer and Curtis (1940) and confirmed by Freston and Loughlin (1942). Kimble, Germek, and Sevringhaus (1946), investigating the vitamin A and carotene metabolism in 116 unselected diabetics, found that 49% of the 59 males and 47% of the 57 females gave values for one or both substances outside the normal range. The predominant type of deviation in the series was low vitamin A and low carotene, and this was particularly noticeable among the older patients and those with infections. A control group of normals, however, also showed variations similar to the above, suggesting that hypovitaminosis A is not likely to be the sole factor, though it might easily be an accessory one. Vitamin A is normally stored in the liver, and its metabolism, as pointed out by Schneider and Widman (1944), is closely coupled with glycogen metabolism in the liver. With the disappearance of hepatic glycogen in uncontrolled diabetes it is obvious that the synthesis of vitamin A will break down with the appearance of hypovitaminosis A.

Prognosis of the Combined Lesions

Study of the mass of literature on the course of pulmonary tuberculosis in diabetic cases discloses a gloomy picture, and without doubt the prognosis is worse than in uncomplicated pulmonary tuberculosis. This may be attributed to (1) the lowered resistance, defence, and repair of the tissues of the poorly controlled diabetic relative to the tuberculous process and its spread; (2) the late stage at which the complication is usually discovered; and (3) complications such as arteriosclerosis, chronic nephritis, and coronary and myocardial degenerations. The prognosis depends on the extent of the tuberculosis when first detected. Since, in the past, the diagnosis has not been established until late it is not surprising that the mortality rate has been high. Lorenzen (1931), for example, reported 143 patients with the combined diseases, and of these only 16 lived more than three years after the tuberculosis was discovered. More recent papers give results which are less pessimistic, and Mark, Mosenthal, and Liu (1942) go so far as to state that it is their impression that with early diagnosis and adequate and careful control of the diabetes the prognosis of the tuberculosis approaches that in the non-diabetic. Certain other writers agree with this.

With regard to the present series 11 out of 17 patients are dead. Of these seven died within the first year, three within two years, and one within three years of the complication being recognized. In two cases the cause of death was coronary thrombosis, and in these cases the chest condition was stationary. In another, death was due to pulmonary embolism—a fortunate escape for a patient whose condition was irretrievable. Of those still alive three are in the critical phase of the first two years, which are well recognized as carrying the highest morbidity.

Treatment

Prophylactic.—The earlier the diagnosis the better the prognosis, and therefore continual anticipation of the

possibility of tuberculosis is to be strongly advocated. A diabetic patient beginning to show unusual features, and particularly in our experience recurrent colds or persistent head colds, should be submitted to *x*-ray examination of the chest; a search for tubercle bacillus in sputum and fasting-stomach contents should be made, and the blood sedimentation rate ascertained. All patients suffering from poorly controlled diabetes, due either to social circumstances or to therapeutic difficulties, should be submitted to radiological examination of the chest every six months, and all other diabetic patients at yearly intervals. Failure to diagnose the combined lesions in the early stages is due to lack of diagnostic consciousness, improper interpretation of symptoms directly or indirectly referable to the chest, and incomplete diagnostic investigation.

Management of Cases.—(*a*) *Of the diabetes mellitus*: This has evolved through the same changes which have characterized the general trend in the treatment of the disease. Fishberg (1932) stated that patients on low-calorie diet certainly lose their glycosuria, but at the same time there is a rapid progress in the pulmonary tuberculosis. As a result of this a high-calorie diet with moderately high carbohydrate intake is generally advocated. According to Root (1940) the standard diet should consist of carbohydrate, 150 g.; protein, 80 g.; and fat, 100 g.; and a diet to increase weight should include carbohydrate, 250 g.; protein, 87 g.; and fat, 120 g. The advantages of high carbohydrate intake have been summarized by Keeton (1941) as follows: (1) the appetite is often capricious and carbohydrate is probably more appetizing; (2) fats are not well tolerated and resultant diarrhoea is prone to occur; and (3) the ketosis which is so frequently associated with the infection is best counteracted by high carbohydrate intake. Adequate vitamin concentrates should be given if indicated. The indications for the use of insulin are the same as in uncomplicated diabetes. Some authorities (Mosenthal and Mark, 1941) state that the clinical course of the combined lesions is more favourable with protamine-zinc-insulin. On the criteria for control there has been much controversy, but essentially it does not differ from that of the uncomplicated case.

(*b*) *Of the Tuberculosis.*—The indications and contra-indications for collapse therapy are the same for diabetics as for non-diabetics. Owing to the high percentage of cases showing exudative and fibro-caseous lesions, the accomplishment of an artificial pneumothorax is often unsuccessful and is frequently complicated by pleural effusion and empyema. On the other hand, patients who tolerate artificial pneumothorax well can be considered for ambulatory treatment as in uncomplicated tuberculosis.

Since most cases come under treatment late in the disease, it is not surprising that conservative treatment is the only possible form in many cases. Of this series only four cases were subjected to artificial pneumothorax. In three of these it had to be abandoned because of failure to collapse the affected area of the lung, and the fourth was complicated by tuberculous empyema.

Summary

Seventeen cases of diabetes mellitus complicated by tuberculosis are described.

Poorly controlled diabetes predisposes to tuberculosis and causes a rapid spread of the disease.

This may be due to a complexity of causes.

A high percentage of diabetic patients acquiring tuberculosis are not adequately treated until the disease is far advanced. This calls for a revision of the diagnostic approach to the problem by routine radiography and sputum examinations.

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A CASE OF VITAMIN C DEFICIENCY

BY

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The following case history presents certain unusual features of vitamin C deficiency and seems to be worthy of record.

Case Report

The patient, a spinster aged 38, employed as a housekeeper, was admitted on June 24, 1946, having vomited blood on three occasions during the previous two days. She volunteered a history of ulcer symptoms extending over six years. These included pain half an hour after meals, which was relieved by taking alkaline powders, and a fear of eating. The symptoms were periodic but had been present during the greater part of the preceding six years. She had adhered to a strict ulcer regime and had refrained from taking fruit and vegetables. A barium meal examination had been made in 1942, but had failed to reveal any abnormality in the gastro-intestinal tract. There was no history of melaena or previous haematemesis even on direct questioning. The bowels were regular and there was apparently no disordered function of the genito-urinary system, though a nephrectomy for tuberculous kidney had been performed in 1928.

The condition of the patient on admission was one of collapse and exsanguination (haemoglobin, 33%—4.6 g. %) necessitating an immediate transfusion. After two bottles of blood had been given, her general condition was greatly improved, but the haemoglobin was still only 33%. A further slow transfusion was started, four and a half bottles of blood being given over 36 hours, after which the haemoglobin was only 39%. Twenty-four hours later another transfusion was started, three bottles being given, after which it was found that the haemoglobin had fallen to 28%. On July 1 the patient vomited 1/2 oz. (14 ml.) of altered blood. In view of the dangerously low haemoglobin three more bottles of blood were given and the haemoglobin was raised to 37%.

The patient had now been in hospital for 10 days, and despite the transfusion of 13 pints (7.4 l.) of blood, the haemoglobin remained virtually unchanged. There had been no reactions to any of the transfusions; no rigors, no haemoglobinuria, and no sign of jaundice developing to suggest that blood was being lost through haemolysis due to any incompatibility. The stools were black from melaena but were well formed—not loose as though there was severe bleeding from the supposed ulcer at any time. During the 10 days that the patient had been under

careful observation she had vomited only 1/2 oz. (14 ml.) of blood, and in view of the ulcer history it seemed probable that the anaemia (which persisted after the transfusion of a greater volume of blood than her own expected blood volume) was caused by a continual loss from a duodenal ulcer and that the amount lost at any one time was not sufficient to regurgitate into the stomach and cause vomiting. Accordingly, the advice of a surgeon was sought, and he thought that the risk of performing a partial gastrectomy on an anaemic patient was in this case justifiable.

At operation the stomach and duodenum were found to be normal, there being no evidence of recent ulceration or scarring from a healed lesion. Melaena was present only in the large bowel. There was, however, slight oedema of the bile duct, although the gall-bladder appeared normal. The surgeon thought that a streptococcal infection of the gall-bladder might be responsible for the oedema of the bile duct and for the bleeding from the intestinal tract. He therefore performed a cholecystectomy and ordered systemic penicillin. In favour of this theory was the intermittent temperature up to 101° F. (38.8° C.) which the patient had been running during the previous weeks and which, in the absence of any physical signs, had been thought to be due to the effects of blood in the bowel. The patient appeared to be progressing satisfactorily for the first 48 hours; there was no post-operative vomiting and the temperature seemed to be settling. On the third day after the operation the patient vomited 4 oz. (114 ml.) of blood, and again on the following day. This time, however, the blood appeared to be coughed up: it was bright and frothy; the patient was not nauseated; it followed a bout of coughing; and the reaction to litmus was neutral. A specimen was sent to the laboratory for spectroscopic examination, and was reported to be oxyhaemoglobin and therefore not due to a haematemesis. After a further two days the patient presented the clinical signs of an acute haemorrhage, although blood was neither vomited nor expectorated. The haemoglobin fell to 25% (3.45 g. %) and the patient became unconscious. Yet another transfusion was begun, and three bottles of blood were given slowly before the vein thrombosed. The condition of the patient was somewhat improved, although the primary cause of the anaemia was still unknown. It had been proved by laparotomy that there was no ulcer present from which the bleeding could occur, and the theory of a streptococcal focus in the gall-bladder being responsible was clearly no longer tenable. Moreover, it had been shown that part of the bleeding was from the lungs. Accordingly other causes of continued blood loss were investigated, notably the blood disorders.

The bleeding time was 65 mins. and the clotting time 5 mins. (capillary-tube method). A blood count showed: red cells, 1,650,000 per c.mm.; haemoglobin, 35% (4.9 g. %); colour index, 1.06; white cells, 20,900 per c.mm. (segmented polymorphs, 72%; non-segmented polymorphs, 9%; eosinophils, 1%; basophils, 2%; lymphocytes, 14%; monocytes, 2%). Seven late normoblasts were seen in counting 100 leucocytes. Some Howell-Jolly bodies were present. The red cells showed mild anisocytosis and polychromasia. The platelets numbered 154,000 per c.mm. This blood count in itself was not diagnostic, and a sternal juncture was performed, with the following result.

The bone marrow showed a marked normoblastic reaction. The case was reviewed completely, and on the evidence of (1) the history of restricted diet taken for several years, (2) the absence of any lesion in the gastro-intestinal tract at laparotomy, (3) the combined haemoptysis and haematemesis, and (4) the blood picture, including the sternal puncture, it was thought possible that the patient was suffering from vitamin C deficiency, even though the gums appeared healthy. On July 15, in the absence of any more rational line of therapy, it was decided to give 1,000 mg. of ascorbic acid intravenously. Within half an hour of this injection there was a dramatic improvement in the general condition of the patient. Instead of being weak, apathetic, and apparently dying, she became alert, bright, and cheerful. It was clearly evident that the ascorbic acid had been responsible for effecting an improvement, and it was continued by mouth in amounts of 100 mg. hourly. From the following morning urine was collected into glacial acetic acid and at the end of a 24-hour period was tested for ascorbic acid. None was found to be present by the colorimetric method. Hess's sign was positive, up to 100 purpuric spots per square inch (15 per sq. cm.) being counted.

Sternal Tap

	%	Limits of Normality %
Segmented polymorphs	15·4	9 –30
Non-segmented polymorphs	15·0	20 –40
Metamyelocytes	11·2	2·5–12
Myelocytes	5·8	2 – 8
Premyelocytes	0·8	0.5– 5
Myeloblasts	0·2	0 – 2·5
Eosinophils	0·0	0 – 5
Basophils	0·0	0 – 1·5
Lymphocytes	4·8	5 –20
Prolymphocytes	3·0	
Monocytes	0·0	0 – 5
Plasma cells	0·6	0 – 1
Normoblasts: Late	29·2	7 –19
Normoblasts: Intermediate	10·0	
Normoblasts: Early	0·8	
Megaloblasts: Late	0·4	0 – 4
Megaloblasts: Intermediate	0·0	
Megaloblasts: Early	0·2	
Pro-erythroblasts	1·2	
Haematocytoblasts	0·2	
Megakaryocytes	0·2	
Mitotic cells	1·0	
Myeloid/erythroblastic ratio,	1.1 : 1	2 : 1 to 8 : 1

On July 18 the urine was again collected for ascorbic acid recovery, and although the patient had had 100 mg. hourly for three days, in addition to an initial dose of 1,000 mg. intravenously, only 11.25 mg. was recovered for the 24-hour period. Even so, the tissues were sufficiently saturated to permit a sum excretion of vitamin C from the urine, but the patient again vomited several small amounts of blood during the day. The haemoglobin was still only 28%, necessitating further transfusion, four bottles of blood being given. A blood count now taken showed: red cells, 2,290,000 per c.mm.; haemoglobin, 34%; colour index, 0.74. The blood film contained a large number of normoblasts not previously demonstrated and suggested a haemopoietic response to ascorbic acid; yet on July 20 the patient again vomited several small amounts of blood, though the general clinical improvement which had marked the commencement of vitamin C therapy was still maintained. Next, the possibility of an associated vitamin P deficiency was considered, and on empirical grounds 150 mg. of hesperidin, four-hourly by mouth, was given in addition to ascorbic acid. No further vomiting of blood occurred, the melaena stools gradually returned to normal, and within a week Gregerson's benzidine reaction was given as weakly positive only. During this time the normoblasts disappeared from the blood, and a reticulocytosis up to 23% occurred on July 24. An attempt was made to hasten the convalescence by the administration of iron. Ferrous sulphate and iron and ammonium citrate were both tried, but were discontinued on account of the dyspepsia which they caused. Colloidal iron was then given, and was tolerated very well.

By Aug. 7 the patient had been receiving 200 mg. of ascorbic acid daily for three weeks, and for the first time the laboratory report indicated that sufficient saturation had been achieved. On iron therapy the blood count improved steadily until Sept. 1, when there was a slight deterioration due to a coincident urinary infection. The infection having been treated, the haemoglobin again rapidly increased until on Sept. 20 it was 83% and the patient was discharged to convalescence. A month later it was 89%.

Summary

This is apparently a case in which haemorrhage occurred from the gastro-intestinal tract and the lungs as a result of vitamin C deficiency and possibly also a deficiency of vitamin P. The patient had previously been treated for a number of years for peptic ulceration, and this, together with a fairly typical ulcer history and an unusual presentation of vitamin C deficiency, prevented the correct diagnosis from being made earlier in the disease.

I am indebted to the medical superintendent, Col. Owen Prichard, for permission to publish the case history, and to Dr. Morton Gill, the visiting physician in charge of this case. I am also very grateful to Dr. Signy and the staff of the E.M.S. Pathological Laboratory at Ashford, whose friendly help and advice were always readily forthcoming.

"GAMMEXANE" AND MOSQUITO CONTROL

BY

G. DAVIDSON, B.Sc.

(From the Ross Institute of Tropical Hygiene)

Field trials with the new insecticide "gammexane" have recently been carried out in Sierra Leone against the adult house-haunting mosquitoes, *A. gambiae*, *A. melas*, and *A. funestus*, with considerable success. Laboratory tests with gammexane have previously shown that it is not only lethal to mosquitoes in smaller concentrations than D.D.T. but is quicker in its action.

Trials were made in small native villages, first using small smoke generators containing the insecticide, and later using residual sprays. Because of the inadequate retention of the smoke by the ordinary native house the smoke generators did not prove very successful in reducing the numbers of mosquitoes. Residual sprays containing gammexane, applied to the internal walls of the houses, reduced the numbers of mosquitoes in the houses very significantly for periods varying from one to six months, depending on the rate of application of the insecticide, the thoroughness of treatment of the houses, and the proportion of any one area treated. The optimum concentration appeared to be 10 mg. of gammexane per sq. ft. (930 sq. cm.) of wall surface [4 pints (2.3 litres) of a 0.5% solution of gammexane to 1,000 sq. ft. (93 sq. m.)], and the effect produced compared in persistence very favourably with that claimed for D.D.T. at 100–200 mg. per sq. ft.

Residual sprays made up of gammexane dissolved in kerosene, and water-miscible oil and water-dispersible powder mixtures containing the insecticide, all produced good results, although the latter mixture was slightly less persistent than the other two.

Throughout these trials it was repeatedly observed that the treatment of most of the houses in a village with sprays containing gammexane not only reduced the mosquitoes in the treated houses but also in the untreated ones. Similarly, the treatment of a group of adjacent villages, where a few of the villages were left untreated as "controls," appeared to reduce the density of the mosquito population in the untreated as well as in the treated ones. This would be expected if the result of treatment was to kill off large numbers of the mosquitoes and so reduce the intensity of breeding throughout the area.

It has been suggested recently that the use of residual insecticides in houses causes the normally house-haunting species of mosquitoes to change their habits and to enter houses only to feed, leaving immediately without coming in contact with the insecticide, or resting for such a short time on the treated surface that no lethal effect is produced. As a result of this change in habits no marked decrease in the malaria rate in the local population would be produced by the use of these residual insecticides. Such an argument has been put forward in the case of D.D.T. Laboratory evidence on the quicker action of gammexane and the evidence accumulated in these trials in West Africa would seem to indicate that this substance does actually kill off large numbers of the mosquitoes, and a consequent reduction in the malaria rate would be expected from its use.

Blood films were taken before and 12 to 22 weeks after treatment of several of the villages involved in these trials, but no significant reduction in the malaria rate was found. It is considered, however, that this period is too short for any great change to be produced. It is hoped that further trials extending over a longer period will be carried out in the near future.

A detailed account of the above trials and their results is to be published shortly.

Medical Memoranda

A Case of Congenital Fibrolipoma of Cornea

The following report of a rare condition is interesting enough to merit publication.

CASE REPORT

A male baby aged 3½ months was brought to the out-patient department of the Wolverhampton and Midland Eye Infirmary as the mother thought "skin was growing over the left eye since birth." There was no history of inflammation or injury. The appearance of the child is shown in the accompanying photograph. The right eye showed normal development. The left eyeball was replaced by a mobile pedunculated rounded swelling about 1¼ in. (3.2 cm.) in diameter. The eyelids and the eyelashes were of normal development and completely covered the eyeball. The cornea and conjunctiva were covered over with a membrane which resembled the skin. A tentative diagnosis of corneal dermoid was made, and the child was kept under observation. Within three months the swelling was getting bigger, so it was decided to operate. Under general anaesthesia the whole mass was removed. The child made an uninterrupted recovery.

The specimen was sent to the Nuffield Laboratory at Oxford, and Miss Mann kindly furnished the following report:

"*Macroscopically*.—The specimen measures 2.5 cm. antero-posteriorly and 1.5 cm. equatorially. The globe appears to be constricted in the middle, where the conjunctiva was attached. The globe is divided antero-posteriorly, the anterior half consisting of a dense white mass replacing the cornea; behind this is a small vitreous chamber with retina and choroid in position and an imperfectly formed anterior chamber, but no trace of lens. The condition is one of congenital fibrolipoma of cornea.

"*Microscopically*.—The cornea is replaced by a mass of fibro-fatty tissue, the surface showing squamous epithelium with skin structures (hair follicles and sweat glands). Beneath this is a layer of fibrous tissue, and beneath this again fat and blood vessels. There is a small malformed anterior chamber, lined with Descemet's membrane and endothelium, but no normal iris or lens, though some peculiar colloidal material in the anterior chamber is probably the remains of a malformed lens. Ciliary processes, retina, and choroid are present. There are many rosette formations (common in malformed eyes). The optic nerve is present, and appears almost normal.

"*Diagnosis*.—Congenital fibrolipoma of cornea."

My thanks are due to Mr. Wyn-Green, assistant surgeon at Wolverhampton Eye Infirmary, for permission to publish this case.

K. MEHTA, M.B., M.R.C.S., D.O.,
Senior Registrar, Ophthalmic Department, Cardiff Royal Infirmary.

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Mann, Ida (1937). *Developmental Abnormalities of Eye*. Cambridge.

The National Institute for the Blind point out that the problem of blindness in British tropical Africa is a serious one. In Uganda, for example, the incidence was found by a joint mission of the Colonial Office and the N.I.B. to be 4,187 per 100,000 population (the comparable figure in the U.K. is 191). One of the chief causes of blindness is ocular onchocerciasis. Major H. Ridley, who investigated the disease on the Gold Coast, is quoted as saying that it is "not inconceivable" that the disease might spread to temperate lands.

Reviews

TEXTBOOK OF ANAESTHESIA

Anaesthetic Methods. By Geoffrey Kaye, M.D., D.A., in collaboration with Robert H. Orton, M.B., B.S., and Douglas G. Renton, M.B., B.S., D.A. (Pp. 706; illustrated. 50s.) Melbourne: Ramsay (Surgical) Pty., Ltd., 340, Swanston Street.

This important work, the result of collaboration between three Melbourne anaesthetists, is intended to guide the graduate taking a house appointment, starting private practice in anaesthesia, or reading for the diploma in anaesthesia. The authors attain this object admirably and cover the whole subject with the exception of local analgesia. The advice given is sound throughout, with enough detail to enable techniques to be understood clearly and carried out. The difficulties inherent in multiple authorship have been overcome completely: the style is smooth and contradictions are non-existent. There are, however, two serious errors in the table of standard colours for British gas cylinders on page 276.

Various subjects related to anaesthesia but which most textbooks ignore are fully considered—for example, there are most useful chapters on blood transfusion and on oxygen therapy. The authors discuss spinal analgesia with a lucidity and moderation noticeably absent from some works. They describe the action of curare well. Unfortunately the dosage given apparently refers to an unnamed American preparation, and gross overdosage would occur if the British preparation "tubarine" were injected in the amounts recommended. The 188 illustrations are well chosen; most are diagrams specially drawn to show the principles upon which various appliances work. These serve a more useful purpose than the usual photographs of apparatus which make so many books on anaesthesia resemble instrument-makers' catalogues. Mr. P. M. Selby has contributed an excellent chapter on legal aspects of anaesthesia. Although this deals with Australian law most of the general principles apply to English common law.

C. LANGTON HEWER.

DIET AND THE SKIN

Skin Diseases, Nutrition and Metabolism. By Erich Urbach, M.D., F.A.C.A., with the collaboration of Edward B. LeWinn, B.S., M.D., F.A.C.P. (Pp. 634; illustrated. 50s.) London: William Heinemann Medical Books. 1946.

This work should be of value to the general practitioner, for he is often required by his patient to advise on diet in relation to skin diseases—a subject that has always obsessed the lay public and for which war and post-war restrictions have greatly increased their enthusiasm. The association in the mind of the layman is natural enough, for conditions such as urticaria, rosacea, and some cases of acne dramatically illustrate the possibilities; allergy is of topical interest and may suggest obscure relationships of cause and effect over a wide range of maladies. A touch of humbug sometimes colours the outlook of both medical men and laity. However, there are certain essential relationships between nutritional and metabolic factors on the one hand and skin health and disease on the other, and it is important that the practitioner should be able to distinguish fact from fiction.

Dr. Urbach, after an interesting survey of the historical background, sets the main facts out clearly. He discusses the importance of vitamin deficiencies, of carbohydrate metabolism, of water balance, of acid and alkali balance, and the essentials of a balanced diet. The first and principal section of Dr. Urbach's work is worth studying, but the same cannot be said for the section which deals with particular skin diseases and the dietetic and metabolic factors concerned, for here the author has not been sufficiently discriminating. He has cast his net widely and recorded most of the work that has been done, but some of it is valueless and confusing. The enthusiastic research worker often elaborates minor coincidental findings into important causative connexions; and Dr. Urbach presents everything without sifting the wheat from the chaff. Exclusion of much of the material in this section would improve the book. A large section on allergy follows the usual lines but it does not, in our opinion, discuss the facts adequately.

The work is well produced and freely illustrated. Many dermatologists, however, will consider unduly optimistic the illustrations showing the effects of dietetic control in some common dermatoses such as psoriasis and neurodermatitis. This book is the first of its kind to appear. If used with judgment and in conjunction with other teaching it will prove helpful to the practitioner.

J. T. INGRAM.

ALLERGY

Allergy in Practice. By Samuel M. Feinberg, M.D., with the collaboration of O. C. Durham and Carl A. Dragstedt, Ph.D., M.D. Second edition. (Pp. 838; illustrated. $10.50 or 58s.) Chicago: The Year Book Publishers, Inc. London: H. K. Lewis and Co.

This book excels in its account of air-borne allergens. Dr. Feinberg was a pioneer and is still a leader in the study of moulds as a cause of asthma and allied disorders. His long chapter on "Allergy to Fungi" should be most helpful to those specially interested in this field of research—for it is yet hardly more than that, especially in Britain, where very few mycological and clinical studies have been reported.

Mr. O. C. Durham, in the chapter on pollens and pollen allergy, covers the published literature from all parts of the world; naturally only a small fraction is directly applicable to Great Britain. His generalizations on pollen dispersal may represent current opinion in America (though he does not quote any authority for them), but they seem to take too little account of modern theories of diffusivity and to emphasize unduly the influence, at a given place, of distant as opposed to local sources of pollen. The new edition includes three new chapters. In one of these Dr. Carl A. Dragstedt describes briefly but clearly the role of histamine in anaphylaxis and allergy. The next chapter is devoted to the new antihistamine drugs and their uses in allergic illnesses. The third new chapter tells how Dr. Feinberg prepares the extracts he himself uses in skin testing. The text of the rest of the book has been brought up to date, though its subject matter in general remains unchanged. The book is a sound and well-presented account of the theory and practice of clinical allergy.

D. A. WILLIAMS.

YEARBOOK OF MEDICINE

The 1946 Year Book of General Medicine. August, 1945–June, 1946. Edited by G. F. Dick, M.D., J. B. Amberson, M.D., G. R. Minot, M.D., W. B. Castle, M.D., W. D. Stroud, M.D., and G. B. Eusterman, M.D. (Pp. 772; illustrated. $3.75 or 21s.) Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1946.

This valuable review, which covers the period August, 1945, to June, 1946, is an excellent reference book and is useful for those who wish to keep abreast of current literature but lack time or easy access to the original articles. The editors' conservative comments are a firm corrective to those who may be too easily impressed by the conclusions of over-enthusiastic writers.

The largest sections of the book are those on diseases of the blood and chest diseases. The latter includes informative articles on the treatment of empyema by the instillation of penicillin combined with systemic administration. Although surgical intervention is often required, healing of the sinus and re-expansion of the lung are much more rapid. It is interesting to note that a substance inhibitory to the tubercle bacillus has been demonstrated in the gastric juice; the pooling of specimens, in spite of increasing the amount of material for search, decreases the chances of demonstrating the bacillus. The only abstract on streptomycin in pulmonary tuberculosis gives, on the whole, a discouraging account. In the section on blood diseases there are four articles on the Rh factor. Wiener states that Rh typing should be done when patients receive multiple transfusions and when transfusions are given to women of child-bearing age. Spies's work on folic acid in the treatment of pernicious anaemia and sprue is given due prominence, and articles on this subject appear both in the section on blood diseases and in that on metabolism and nutrition. The latter section contains several interesting articles on protein require-

ments in health and disease. Helmuth Sprinz emphasizes the importance of protein deficiency rather than vitamin deficiency as a primary factor in malnutrition.

The section on heart disease does not record any great advance in treatment or diagnosis, but there are useful reviews of current opinion on cardiac surgery and methods of digitalization. The use of strict bed rest in cardiac failure and in active tuberculosis is also discussed. The 1946 Year Book gives the impression that many workers, particularly in America, are pausing to evaluate a variety of tests and investigations in the hope of simplifying the diagnostician's task, and that the clinician, though more willing to subject his patient to major surgical procedures, is concentrating on early functional recovery.

M. NEWHOUSE.

CHEMICAL IDENTIFICATION

Characterisation of Organic Compounds. By F. Wild, Ph.D., F.R.I.C. (Pp. 306. 18s.) Cambridge: The University Press. 1947.

The amazing development of modern chemistry, especially in relation to biology and medicine, has necessitated a refinement of standards as well as of methods. Although new compounds or factors may be discovered by analogy and elucidated by circumstantial chemical evidence, it is not always realized, as Dr. Wild reminds us, that "in general the tests classify but do not identify the compound." Qualitative reactions, such as empirical colour tests, may be of use in that they guide the bee of research to the flowers; but absolute identification, the only sure basis for chemical knowledge, demands the preparation of pure derivatives with measurable physical characteristics.

In this conscientious and lucid book the author has collected, summarized, and described with full practical details the most convenient methods for the identification of individual members of the chief types of organic compounds. The extent of the area covered is shown by the index, which contains over 2,000 entries; and the text is amply provided with tabulations and formulae. The book will be of great value as a work of reference, and also a useful guide to the individual research student, for it contains much information that is often required and presents it clearly.

W. R. FEARON.

JAUNDICE

The Differential Diagnosis of Jaundice. By Leon Schiff, Ph.D., M.D. (Pp. 313; illustrated. $5.50 or 30s.) Chicago: The Year Book Publishers, Inc. London: H. K. Lewis and Co. 1946.

A book whose author discusses the differential diagnosis of a single symptom is liable to be a sketchy review of the disorders to which the particular symptom is common. Dr. Schiff has not entirely overcome that defect. In most of his book he gives a conventional account of the morbid processes that cause jaundice; the descriptions are in the main adequate, but since their central theme is necessarily jaundice they sometimes lack proportion—for instance, his account of Weil's disease suggests that jaundice occurs in every case. He neglects the pathology of jaundice and relegates his description of its general characteristics to only 13 pages. Details of laboratory methods are described in an appendix, but we should have welcomed a fuller evaluation of their significance. The section on radiology contains some excellent skiagrams, particularly of ampullary and pancreatic carcinoma. Liver biopsy is well described and some illustrative photomicrographs are included.

While parts of the book are informative it is not sufficiently comprehensive for the physician particularly interested in hepatic disease, and a monograph on a single symptom cannot appeal to the harassed student. The English is at times uncouth—as, for example, when the author writes of cirrhosis of the liver: "the disease is prone to occur in occupational groups in which there is contact with alcoholic beverages."

R. BODLEY SCOTT.

Medical Bookman is published by Harvey and Blythe, 6, Hanover Square, London, S.W.1 (6d. monthly), and edited by Drs. F. Croxon Deller and W. R. Bett. A few monthly issues have already appeared. As the title suggests, books are the chief interest of this enterprising venture. The Editors also hope to find space for reporting learned societies and Stationery Office publications.

BOOKS RECEIVED

[Review is not precluded by notice here of books recently received]

Muscle Testing. By L. Daniels, M.A., M. Williams, M.A., and C. Worthingham, M.A. (Pp. 189. 12s. 6d.) Philadelphia and London: W. B. Saunders. 1947.

An illustrated survey on manual muscle testing used to assess muscular weakness resulting from disease, injury, or disuse.

Week-Ends for Henry. By Hester Holland. (Pp. 192. 9s. 6d.) London: Hurst and Blackett. 1947.

An adventure story.

Appendicite et Urologie. By L. Strominger. (Pp. 165. 240 francs.) Paris: Masson. 1946.

A clinical study of the relationship between appendicitis and urological affections.

L'Anesthésie Intra-Veineuse au Pentothal-Sodium. By Ernest Kern. (Pp. 92. 100 francs.) Paris: Masson. 1946.

A short account of the uses, technique, and effects of thiopentone anaesthesia.

Blind Intubation and the Signs of Anaesthesia. By J. U. Human, M.R.C.S., L.R.C.P., L.D.S., D.A. 3rd ed. (Pp. 230. 10s. 6d.) London: H. K. Lewis. 1947.

An account of the physiology and signs of anaesthesia, endotracheal technique, and principles of premedication, intended primarily for the newly qualified.

Surgical Note-Taking. By Charles F. M. Saint, M.D., M.S., F.R.C.S. 4th ed. (Pp. 106. 4s. 6d.) London: H. K. Lewis. 1947.

A summarized account of surgical note-taking for students and dressers.

Nursing and Diseases of Sick Children. Ed. by Alan Moncrieff, M.D., F.R.C.P. 4th ed. (Pp. 744. 30s.) London: H. K. Lewis. 1947.

Intended as a textbook for nurses, this edition includes new material on the sulphonamides, penicillin, and other topics.

Diagnóstico y Terapéutica Quirúrgicos de Urgencia. By Dr. F. Doménech-Alsina. (Pp. 912. No price.) Barcelona and Buenos Aires: Salvat. 1947.

Illustrated textbook of emergency surgery and surgical procedures.

The Dentists Register. Published under the direction of the Dental Board of the United Kingdom. (Pp. 346. 15s.) London: Constable. 1947.

Nutrition in Industry. By the International Labour Office, Montreal. (Pp. 177. 6s.) London: Staples Press. 1946.

An account of wartime measures in Canada, the United States, and Britain to safeguard the nutrition of industrial workers.

Local Anaesthesia: Brachial Plexus. By R. R. Macintosh, M.A., M.D., F.R.C.S., D.A., and William W. Mushin, M.B., B.S., D.A. 2nd ed. (Pp. 56. 10s. 6d.) Oxford: Blackwell Scientific Publications. 1947.

Local analgesia produced by injection of the brachial plexus, illustrated with many diagrams and photographs.

Anais do Segundo Congresso Médico Paulista. Vols. 1 and 2. By Prof. Dr. C. Gama, Dr. P. A. Netto, and Dr. O. C. Gordinho. (Pp. 653 and 1,035. Cr.$150,00 and Cr.$200,00.) Sao Paulo, Brazil: Edigraf. 1945.

A collection of papers presented at the Second Congress of the Sao Paulo Medical and Surgical Association.

Psychological Disorders in Flying Personnel of the Royal Air Force. (Investigated during the war 1939-45.) Air Ministry Publication. (Pp. 344. 7s. 6d.) London: H.M. Stationery Office. 1947.

Experimental Embryology in the Netherlands, 1940–1945. By M. W. Woerdeman, M.D., and Chr. P. Raven, Ph.D. (Pp. 132. Florins 6.50.) New York and Amsterdam: Elsevier Publishing Company. 1946.

Papers by various contributors on experiments on amphibious eggs.

The Mind and Death of a Genius. By David Abrahamsen, M.D. (Pp. 228. 16s. 6d.) London: Geoffrey Cumberlege. 1946.

A biography of Otto Weininger by a psychiatrist.

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NUTRITION IN GERMANY

The "hunger marches" in Hamburg and Hanover last week lend special interest to a recent survey of the state of nutrition of the urban population in the British, French, and United States Zones of occupation in Germany by a committee of experts,[1] which toured the three Zones in April. It is unfortunate that the committee was not able to see for itself the state of affairs in the Russian Zone. Russian members of the committee and routine surveys in that Zone would do much to dispel the notion that the Russian Zone flows with milk and honey. The committee found that body weight in the adult population had changed little since December, 1946. Children between 6 and 14, old people over 60, and persons consuming only the "normal consumer ration" of 1,500 calories per day were in the poorest state of health and nutrition. A "normal consumer ration" is not sufficient to prevent loss of weight, and the committee suggest that normal consumers have been able on the whole to obtain from extra-legal sources or from the pooling of rations from other members of the family in a higher ration category an additional amount which must provide at least 350 calories per day. It is obvious that most of these additional calories must come from local supplies, that is, from the country districts near to the cities and towns, and the most readily available foodstuffs from which they can be obtained are bread and potatoes. If all were obtained from bread, the extra-legal consumption of bread grain would be about 100 g. per day, and, if potatoes, about 500 g. per day. Assuming that 10 million people, a modest estimate, were consuming these foodstuffs, the drain on local supplies would be about 30,000 tons of bread grain per month or 150,000 tons per month of potatoes.

Prices vary considerably throughout the Zones. Potatoes in one small town have been quoted at 50 pfennig per kilogram and in others at 5 marks for off-the-ration supplies. In other areas barter transactions alone secure supplies, a sure sign of scarcity and lack of confidence in the currency. The inevitable result of this extra-legal traffic in foodstuffs has been to freeze supplies and to prevent the free transfer of food from the producing areas to the larger towns by the local German Food Administration. The British Zone, which is predominantly urban, is severely affected by this failure of distribution, and no fusion of the Zones will prevent its remaining so while supplies are gravely inadequate. The same hoarding and bartering of food by the producers has been observed in other European countries in times of scarcity. In the first three months of this year at least 130,000 tons of grain have been held back by farmers largely to enable them to secure consumer goods such as clothing and household utensils in short supply. While this withholding of supplies has worsened the situation, local supplies, even if all were collected and distributed, would contribute only a very small proportion of the food necessary to honour the normal consumer ration. A dangerous situation has now developed. Since the committee rendered its report the bread ration has been halved and the normal consumer ration has in consequence fallen from the official 1,550 to around 1,000–1,100 calories. This reduction, however, is only an official recognition of the fact that the normal consumer ration has not been fully honoured in large areas of the three Zones for some months. Lack of grain shipments has been largely the cause of this deficiency, but supplies of other rationed foodstuff have been reduced also. Imports are necessary but difficult to secure. The problem of supplying Germany is not a Zonal responsibility but one involving the world-wide allocation of food supplies.

With such a background the findings of the committee are by no means surprising. Lack of calories and protein have resulted in loss of weight in normal consumers. Such weight losses, however, have not increased since the last survey in December. Sharing of family rations and extra-legal supplies have not prevented a serious failure to gain weight in the children between 6 and 14 years. The need for more milk in this age group is clearly apparent, but it was not available. Old people fared badly. Unable to contribute to the family pool by collecting food in the country and mostly unable to earn enough to purchase supplies at high prices in the towns, they suffered much loss of weight, and in them oedema is widespread. The appearance of oedema in workers below the age of 50 can be attributed only to a serious deficiency in the calorie intake. In spite of the extra food given to these workers they are being called on to expend more energy than is available in their total ration, shared as it is within the family group. Where possible school-children have been given, five times a week at the most, school meals equivalent to about 300 calories. Those over 14 still at school are thus in a better nutritional state than their coevals in industry. The latter are thin and obviously poorly nourished. Babies on the other hand were well developed, but rickets is prevalent in them. Exact figures are not available, but some indication of the prevalence of rickets in Germany in 1939 was provided by a house-to-house investigation carried out in the months of June and July, 1939, in Frankfort-on-Main (now in the American Zone). Nearly 800 children were found to have been born in February and March of that year. Of these it was possible to examine 76%—that is, about 600—aged between 2½ and 5 months.[2] It was then found that just over 80% of the infants examined showed evidence of healed or florid rickets, the principal manifestations being craniotabies, rickety rosary, Harrison's sulcus, "pot-belly," and muscular hypotonia. E. Graser, who recorded the investigation, suggested that vitamin D should be distributed as a routine to all infants. Dr. Graser wrote (*this was in the summer of 1939*): "Whether rich or poor, highborn or lowly, in our city every baby suffers from rickets unless special precautions are taken."

[1] *Combined Nutrition Committee (Br./Fr./U.S.).* Report of the Seventh Combined Nutrition Survey. April 26, 1947.

[2] *Z. Kinderheilk.*, 1939, **61**, 520. See Annotation, *British Medical Journal*, 1940, **1**, 577.

There is apparently no lack of supplies of vitamin D in Germany at present, but they have not always been distributed or made readily available for infants and young children. The committee has drawn attention to the presence of clinical signs indicative of vitamin deficiencies. These were mainly deficiencies of vitamins A and C. They may be seasonal, but their presence is serious in young children and young adults. It is interesting to record that though the carotene intake and blood levels were normal or high, the body was not able to convert carotene into vitamin A in quantities sufficient for its needs. The nutritional status of heavy workers and underground miners is reasonably satisfactory. Their rations plus the extra food supplies which they can obtain by the points system enable them to maintain normal weights. But there is no doubt that they share the extra ration with their families; and this is reflected in the output of coal from the Ruhr and in unrest among the miners. Tuberculosis —both notifications and deaths—has continued to increase. Comparison with the returns for the corresponding periods of 1946 shows clearly that the rise is a real one and not due only to an unusually severe winter. Other infectious diseases apparently gave no cause for alarm.

It is impossible to predict what will happen during the next three months before the first harvests are available for distribution. There can be little doubt that the reduction in the basic or normal consumer ration which has now taken place will produce more serious effects than the one enforced a year ago. It is unlikely that the children will be seriously affected, because the Hoover Relief Programme for school-children will ensure that the most needy will have a good midday meal on five days in each week. The old people and the younger workers in industry will probably suffer most physically. The ration reduction will have, however, a more serious consequence—less tangible but very real. The loss of confidence in the local food administration, which is largely in German hands, will undermine the Allied endeavour to inculcate a sense of responsibility in the local administrations. Widening the margin between the official ration and the amount needed for mere subsistence cannot fail to aggravate the danger—now a reality—of inequitable food distribution and will encourage black market transactions. It must endanger the policy of sharing local food supplies between the Zones and encourage farmers to hold their produce rather than hand it over to the local authorities. Only adequate grain shipments and a bountiful potato harvest in Germany will prevent the winter and spring of 1947–8 from bringing famine and unrest.

The political structures of the British and American Zones differ, and this difference renders effective combined action difficult. In the American Zone the *Länder* (States) have extensive powers of self-government, and the *Länder* Governments, according to *The Times* diplomatic correspondent (May 13), resent interference from the bi-zonal agencies which deal with such matters as transport and food. Those who conducted the Combined Nutrition Survey last month observed that "large supplies of food are obtained by the population from unofficial sources." There is a wide circulation of food by post from rural districts, and in all three Zones members of the Survey observed people travelling by train with heavy bags of food. This large-scale black-market operation ought to be brought to an end by the Germans in the interests of the Germans, but until the economic and political difficulties have been solved the farmers in the American Zone will keep their corn to themselves.

OCCUPATIONAL DISEASE IN REVIEW

The Minister of National Insurance has appointed a committee[1] to review the policy adopted in scheduling occupational diseases under the Workmen's Compensation Acts and to advise on the selection of diseases for insurance under the National Insurance (Industrial Injuries) Act. This Act came on the statute book in 1946 and will become operative during 1948, although the appointed day has not yet been announced. It will replace the present system of compensation under the Workmen's Compensation Acts, which will be repealed. The principle of listing, or scheduling, occupational diseases is to be retained, and under the new Act they will be known as "prescribed" diseases. "A disease may be prescribed . . . if the Minister is satisfied that it ought to be treated, having regard to its causes and incidence . . . as a risk of their (insured persons') occupations and not as a risk common to all persons; and it is such that, in the absence of special circumstances, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty." The Minister must decide at an early date which diseases are to be included within this definition, and so he has set up this committee to advise him.

The first Workmen's Compensation Act became law in 1898. Its importance in industrial legislation was soon evident, and its provisions were widened in the Act of 1906, particularly in regard to occupational diseases. The Third Schedule appended to this Act specified six conditions for which the worker could claim compensation: mercury, lead, phosphorus, and arsenic poisoning, anthrax, and ankylostomiasis in miners. It was realized almost immediately that there were other diseases which could be added to the Schedule, so in August, 1906, the Home Secretary set up a committee "to inquire and report what diseases and injuries, other than injuries by accident due to industrial occupation, were distinguishable as such, and could properly be added to the diseases for which compensation was paid under the Workmen's Compensation Acts." This committee had Mr. Herbert Samuel, M.P., now Viscount Samuel, as chairman. The two medical members were the Regius Professor of Physic at Cambridge University and the Medical Inspector of Factories—at that time there was only one medical inspector. The committee took evidence at forty-one sittings in London, Birmingham, Manchester, Swansea, Glasgow, and other industrial cities; it visited many factories; and the medical members examined a number of workers. Before any disease was scheduled the committee applied three tests: Was it outside the category of accidents and diseases already covered by the Act? Did it incapacitate from work for more than one week (the

[1] Members of the committee are Judge E. T. Dale, chairman, with Sir R. R. Bannatyne, Mr. S. Chapman, Mr. C. R. Dale, Dr. J. Vaughan Jones, Prof. R. E. Lane, Dr. E. R. A. Merewether, Mr. H. M. Piper, Mr. F. Stilwell, Dr. A. L. Winner, and Mr. F. K. Forrester, secretary.

minimum period for which compensation was payable)? Was it so specific that the causation of the disease or injury by the employment could be established in individual cases? The result was that some sixteen diseases were added to the Schedule, thus enlarging the list to twenty-two in all. Conditions such as poisoning from carbon monoxide, sulphuretted hydrogen, sodium cyanide, and potassium chlorate, as well as "brass-founders' ague," mange, and bottle-makers' cataract, while fully investigated by the committee, were not included.

By 1946 the scheduled diseases[2] had gradually increased to forty-four, largely on the advice of the Factory Department,[3] and included "cataract in glass-workers." Silicosis, asbestosis, and the condition of the lungs known as dust reticulation are not scheduled under the Act in the ordinary way, but power has in the past been given to the Minister to make special schemes for the compensation of workers employed in specified industries or processes who contract one of these diseases as a result of their employment. A number of schemes have been drawn up—for example, the Refractories Industries (Silicosis) Scheme, the Metal Grinding Industries (Silicosis) Scheme, the Various Industries (Silicosis) Scheme, and so on. Here, surely is an opportunity for the new committee to do some tidying up, particularly in linking diseases with industrial processes. In the new Act, as in the Workmen's Compensation Act, there is mention of the pneumoconioses. Dust reticulation, however, is mentioned for the first time.

The Industrial Injuries Act has other implications, some of which were discussed by Stewart[4] when the Bill was being debated. In establishing a claim for compensation the present procedure is for the worker said to be suffering from a scheduled disease, say dermatitis, to be examined by the examining surgeon. He then receives a certificate stating that he is, or is not, suffering from the disease. Appeal from this decision, by the man or his union, or by the firm through its insurance company, is to a single medical referee, whose decision is final. Neither of these procedures is to be retained. Medical boards and appeal tribunals are to be set up instead. Wisely, the Act allows questions as to temporary disablement to be referred to a single medical practitioner appointed by the Minister, instead of to a medical board. But no one doctor can, as in the past, be both judge and jury. This is fairer to the worker and to the medical profession.

Another important change is that payments will be made by the Ministry of National Insurance from a fund contributed by workmen, employers, and the State. Private insurance in this respect will cease, as will much of the work done now by doctors on behalf of insurance companies. The fund will normally have an annual income of over £25,000,000, and the number of persons employed in industry and covered by the Act, but not necessarily at much risk, is over 18,000,000.[5] Benefits are of two types: (*a*) an injury allowance payable for 26 weeks; (*b*) a disablement pension payable when the man continues to be incapable of work after this period. Future compensation will be based not on loss of earning power but on the character of the injury; the loss of a finger may leave the earning power of one man unimpaired but seriously interfere with the earning power of another, yet both will receive the same allowance or pension.

An important issue is raised when the rates of benefit under this Act are compared with those under the new National Insurance Act. Persons suffering from injuries and diseases arising out of their employment will receive somewhat higher rates of benefit than individuals disabled by conditions which have not been "prescribed." The fact that there is a difference may give rise to abuse. The sick worker, comparing the two schemes, may try to obtain the more favourable return for his contributions by claiming that his disability was caused by his work; or he may try to prolong his absence beyond the 26-week period and thus qualify for a pension. This will no doubt exercise the minds of the new committee and particularly its medical members, to whom the problems of certification are well known. When it appears that a man's disability may have been caused by his occupation, a feeling of resentment against his work and his employer is not infrequently created. This may retard cure and prolong incapacity periods. If a disability is regarded as not due to work (involving perhaps only 10s. a week less in benefit) the man is often readier to return to his job, and psychological disturbances do not arise. This is one cogent reason for asking the committee to go carefully before it adds to the list. "Aggravation" clauses which the trade unions may press for should also be opposed, not necessarily for highly technical or legal reasons but in the direct interest of the workers.

On both sociological and economic grounds, however, the new Act is, on the face of it, a more satisfying document than the Workmen's Compensation Act. For one thing, it deals with prevention, hopefully perhaps, but the fact remains that it creates hope, and it appears to be constructive. Section 73 states that the Minister may promote research into the causes, incidence, and prevention of industrial accidents, injuries, and disease; he may himself employ persons to do this or help other workers financially. Judgment will be suspended until there is evidence of practical implementation of this part of the Act. For example, what is to be the link with the Medical Research Council? Clearly, however, the country cannot afford to pay out vast money benefits without the closest scrutiny of methods of preventing injury and disease. The worker, now a partner in the payment of contributions as well as a potential recipient of benefits, must become as eager a scrutineer as, no doubt, will be the officials of the new Ministry of National Insurance.

[2] *Memorandum on the Workmen's Compensation Acts, 1925-45.* H.M.S.O. 1946.
[3] *Annual Report of the Chief Inspector of Factories for* 1932, p. 53. H.M.S.O. 1933.
[4] *British Medical Journal*, 1946, 1, 561.
[5] *Ministry of Labour Gazette*, 1947, **55**, 77.

TREATMENT OF FILARIASIS

Filariasis due to *W. bancrofti* has long been an unsolved problem in therapy. The highly developed worms in the tissues and the easily demonstrable microfilariae in the blood seemed as if they ought to be vulnerable to suitable chemical compounds. But for many years all therapeutic trials ended in failure, and patients with recurring lymphangitis, elephantiasis, and the other sequelae of this infection continued to lack any radical cure. Tests with different substances have been made by many observers ever since Manson fully described the condition. After

treatment the microfilariae were as numerous as ever, and it was concluded that the treatment, whatever its nature, was ineffective.

Investigation has been handicapped by the absence of a suitable experimental animal. Filarial worms are highly specific to their proper hosts, and the fact that transmission takes place only through insect vectors made the maintenance of the infection in the laboratory almost impossible. Dogs sometimes carry *Dirofilaria inmitis*, but dogs are big and expensive, and the infection takes a long time (9 months) to develop. However, during the war American workers found that the wild cotton rat, caught in Florida for virus research, often harboured a filarial worm, *Litomosoides carinii*, and in 1944 Culbertson and Rose[1] showed that this was a convenient animal for chemotherapeutic research. Infection can be transmitted from one rat to another by certain mites (*Liponyssus bacoti*), and these rats and their worms are now being used in British laboratories in the search for new chemotherapeutic preparations. Study of this filariasis of cotton rats led almost immediately to a discovery which is fundamental for the interpretation of the effects of treatment. Culbertson and Rose found that antimony compounds were quite effective in killing the adult worms, but that the microfilariae were apparently untouched and continued to circulate in the peripheral blood for several weeks or months before they ultimately disappeared. Consequently, to measure the effect of drug therapy in man it is not enough to examine for microfilariae at the end of treatment: the patients must be followed up for long periods.

Brown[2] carried out the first clinical trial on these lines in 1944. He treated 12 patients with anthiomaline and found the microfilariae of 10 of them reduced to 0 or 15% in four to seven months. Culbertson and his colleagues, who are responsible for the chief development of the subject, treated 114 patients in Puerto Rico. They used various antimony compounds and compared the microfilaria counts in their cases with those of 15 untreated controls. At a recent meeting in London[3] Culbertson described how the control cases were followed for twenty-six months and the blood never became negative. In patients treated successfully the microfilariae gradually grew fewer, and after three to thirteen months the blood was free from parasites, thus indicating the death or permanent sterilization of the parent worms. Neostibosan had this effect in 25 out of 35 patients; other antimonials were less successful. The doses given were often very large—for example, in an adult 12–15 g. neostibosan during fourteen days. This intensive treatment was well tolerated by patients in Puerto Rico; but during a subsequent trial in Mexico it caused nephritis in 5 patients and one death in a series of 20 cases. The reasons for this difference in tolerance are unknown, but the experience indicates the need for caution. Trials on 3 patients infected with *Loa* yielded equivocal results, and trials on patients infected with *Onchocerca volvulus* showed clearly that this infection is resistant to neostibosan.

This treatment is not yet a practical proposition for filariasis, unless the patient suffers from severe lymphangitis at frequent intervals. In most other cases the expense, labour, and danger of toxic effects outweigh the benefits gained. But Culbertson's results show that radical cure of filariasis is indeed possible, and they will encourage a further search for more effective compounds. To control filariasis, treatment of the whole population in infected areas will probably be desirable, and for this purpose a drug will be needed which, preferably by mouth, is effective, non-toxic, and cheap.

[1] *J. Pharmacol.*, 1944, **81**, 199.
[2] *J. Amer. med. Ass.*, 1944, **125**, 952.
[3] Royal Society of Tropical Medicine and Hygiene, April 10.

GERMAN MASSACRES

The recent conviction of Rudolf Hoess, the German commander of the concentration camp at Auschwitz, serves as another reminder of the abominable depths to which Nazi Germany sank, of a Germany which used to claim to be the most enlightened exponent of Western culture and civilization. Hoess, who is described by *The Times* of April 25 as "a man aged 47, the father of five children, with a fair, characterless face and the mild demeanour of a clerk," was convicted of having been responsible for the death of 4,000,000 persons in the Auschwitz camp. His defence was the usual one—that he was carrying out the orders of his superior, in this case Himmler; and he supported this defence in a characteristic manner by denying that the crematoria were adequate to deal with 4,000,000 people, while admitting that 1,500,000 Jews were certainly gassed. No doubt the main purpose of this massacre was ideological: the victims were Jews and Slavs—that is, people whom the Germans conceived of as belonging to "inferior races." Equally a part of the German conception of waging war was the taking of reprisals on an enormous scale. On March 24, 1944, 335 men and boys were murdered in the Ardeatine Caves in Italy; their only crimes were that they were Jews or anti-Fascists. They were massacred in reprisal for the killing of 32 German soldiers by an Italian student, who escaped. None of the hostages had taken part in the ambush. Macleod[1] states that the victims were selected arbitrarily. All the captives held in the Via Tasso and other German prisons, numbering about 270, were selected for execution. Since the Nazi commander (General Meltzer) had announced that 10 Italian lives must be taken for each German killed, another 50 were required to bring the total to 320; these were found among political prisoners in a civilian jail. In addition the Italian Chief of Police (Caruso) included 15 of his personal enemies. A British military court has found Field-Marshal Kesselring guilty of being responsible for this and other massacres, and on May 6 condemned him to death by shooting.

Of the various circumstances in which a massacre is carried out—to serve as an example, in the heat of battle, or because of "racial" enmity—the last is the most terrible and the most hideous. Prof. Henri Desoille,[2] who was an inmate of several German concentration camps, reveals the German degradation of human values in these words: "Music also played an important part in these camp tragedies. Before an execution the victim was paraded on a cart with flowers and orchestra. Finally the hanging took place, always to music. Then the prisoners were made to file before the hanged and compelled to laugh at them on pain of being beaten."

The fate of Germany still hangs in the balance, and the ordinary man feels helpless and bewildered when he reads in the Press the claims and counter-claims, the assertions and the rebuttals of men in control of the destinies of States recently closely allied in the struggle against a country which by its behaviour has postponed the right to be called civilized. It is easy to explain the German tragedy by calling it "a national psychosis" or, to use an old phrase, to dub Germany "the sick man of Europe." As medical men we may try to analyse in psychological terms the mental aberrations of the Nazi leaders and their followers. But no theories can explain away the facts, and the facts seem to be symptomatic of the decline of European civilization and of the decay of ancient faiths.

[1] *J. R.A.M.C.*, 1946, **87**, 10.
[2] *Arch. Méd. soc.*, 1946, **2**, 523.

PHYSICAL THERAPY OF MENTAL DISORDER*

BY

D. W. WINNICOTT, F.R.C.P.

The full title of this talk was "Some Reasons for a Personal Prejudice against the So-called Physical Therapies of Mental Disorder." By representing my ideas in this form I admit that I prejudge the situation. This may be an unscientific approach, but perhaps it is a suitable one in the case of such unscientific methods of treating the disordered mind. My objections are not to the brutality of the methods. Compared with psychiatric illness, even a broken back is not much, and a broken leg nothing. Moreover, with good care these accidents can be so reduced as to be negligible. I of course assume the good faith of those who practise the arts against which I am prejudiced. I know of no case whatever in which I would ascribe the giving of physical therapy to any but the ordinary motives of the practising physician.

Science in Medical Practice

A doctor is consulted because someone suffers. Patients, and especially relatives, demand therapy; but the doctor is trained in the scientific method, and his job is to apply science. The doctor is asked to cure magically, but he applies science. By so doing he disappoints even if he gives relief to his patient. But he serves the community by being part of a bulwark against superstition. It is open to anyone to go to a quack for magical relief, but it is the doctor who is expected to represent science, or objectivity, and to be not afraid to do nothing if science cannot help. Diagnosis is based on scientific knowledge; the basis of therapy should be the same.

Scientific Psychology

A scientific approach to mental phenomena follows on acceptance of the theory that mental disorder is a disorder of emotional development, that the basis of mental health is laid down on what is inborn, from birth, by the course of development of the personality and development of the individual's emotional contacts with external reality. Through Freud's formulations and work, especially his method for objective investigation of unconscious phenomena, there has been a steady development of psychological insight.

The development of scientific psychology could briefly be described in three stages: the first bringing understanding of neurotic ambivalence, the second bringing understanding of depression and hypochondria, and the third bringing understanding of the more primitive mental states which reappear in the insanities.

First came the elucidation of the disturbed relationships between people and the disturbances in people of their instinctual functions as a result of their unconscious conflicts. The work was done from the sorting out of love and hate as it emerged in the transference situation. Following this, as it appears to me, the patient's conscious and unconscious fantasy about himself began to become analysed: his depression and conscious sense of guilt became his sense of something wrong inside himself, and the psychology of hypochondria became the psychology of the results of loving and hating. The incorporation and discharge of objects came into the analytic interpretation. Melanie Klein's work made all this possible, and mania as an alternative to depression was seen to be an extreme example of hypomania as a denial of depression.

The new work on depression naturally linked up with the examination of the integration of the personality itself, and phenomena of integration and reality appreciation, etc., began to be able to be dealt with in the transference developments and to be brought into relation to instincts. These developments have enabled psychology to encroach on the domain of the alienist, the doctor who manages the insanity case.

Convulsion Therapy

Along with this steady progress of psychological science there has been a development of the practice of convulsion therapy. My main objection to convulsion therapy is that it comes as *an escape from the acceptance of the psychology of the unconscious* and from the implications of the psychological developments of the past fifty years.

It is well known that there are several techniques, but from my point of view the electric technique is worse than the others because of the ease with which it can be done. Moreover, electricity has special significance for the unconscious, and paranoid and schizoid persons are well known to mix up the idea of electricity with ideas of magical influence. Such considerations do not necessarily make E.C.T. bad, but they certainly put us very much on guard when we interpret results, and when we meet the prejudice in favour of E.C.T. that is common among psychiatrists to-day. Whatever the technique, convulsion therapy is empirical. No one has the slightest idea how it works, when it does work. It is true that empiricism carries no final objection. However, scientists hate empiricism and regard it as a stimulus to research.

Our responsibility is great. What is done here in England tends to be done blindly in many parts of the world, especially where there is no access to libraries or training in psycho-analytic method or free scientific discussion. The sociological ill effect of a therapy has to be considered as well as the immediate effect on individuals.

Theory of Mental Health

The march of psychology, because of psycho-analysis, is towards the completion of the theory of mental disorder as a disturbance of emotional development. The basis of mental health is being laid down in infancy, in the developing relationship between infant and mother, and even in a more primitive way between the infant and his subjective mother, and more primitively still in the infant's self-establishment. The result of this theory is the fruitful one that the prevention of mental disorder is a new task of paediatrics. In contrast, the result of the empirical therapy of mentally ill people by physical methods is a relatively unfruitful one; it is that more and more neurologists must be found who are qualified to give people fits. These are two sociological results that can be compared one with the other.

Many besides myself have deplored the fact that convulsion therapy inevitably leads away from the psychological approach to a biochemical and a neurological one. Convulsion therapy attracts to mental hospitals people with first-rate qualifications for dealing with the complexities of insulin shock and of all the biochemical changes that need study in this kind of work. The physical therapies in general draw to psychiatry physically minded young doctors, and it is always unlikely that men and women who have reached a high degree of postgraduate training on the physical side will be willing or able to start again and to go into psychology at its beginning. Leucotomy in an extreme degree attracts the wrong kind of doctor to psychiatry. To my mind the modern acceptance of leucotomy is the direct result of the acceptance of empirical shock-therapy.

If the sociological results of convulsion therapy are bad the sociological results of leucotomy are deplorable. I think leucotomy is the worst honest error in the history of medical practice. In mental hospitals the result of leucotomy is a new accession of power to the neurosurgeon, an unqualified practitioner from the point of view of the psychologist. Let us not be deceived by his very high degree of skill as a neurosurgeon, this having nothing to do with the case. If one deplores leucotomy and its collaterals one must deplore the convulsion therapies that paved the way for it. The feeling against leucotomy is too great to find expression—the general public and doctors alike are too appalled by this application of empirical method to do anything about it. And they are afraid that if they raise objections the psychiatrists will cease to relieve them of the awful burden of insane relatives and patients.

Let me apply the formula I devised earlier on. Now, instead of private suffering with demand for magical treatment being met by the doctor who applies science, it has become true to say that society's suffering (on account of its mentally ill members) leads to the use of the doctor (because of his being supposed to act according to scientific principles) to cover a panic application of magic. Leucotomy should be a quack remedy, available for those who ask for "cures."

*Abridgment of a paper read before the British Psychological Society (Medical Section) on Nov. 27, 1946

From this subject of leucotomy with its irreversible brain changes I come back to convulsion therapy with a feeling of relief. At least here no damage is done (so we blandly assume). If it should turn out that the effects, good and bad, of E.C.T. are, after all, psychological effects, no one individual has been finally hurt, and the convulsion subject can still employ psychotherapy if it should come his way. He can even recover spontaneously in the course of time, with good management, if he is so disposed.

Objections to Convulsion Therapy

To condense my views so far expressed I would say I would not give convulsion therapy, because (1) I would not have it done to myself; (2) it draws to psychiatry the wrong kind of doctors, skilled in the wrong way; (3) it undermines the public's justification for relying on doctors to keep their scientific heads in face of the demand for magic; (4) this form of therapy done here in England leads to mass treatments by the same methods of treatment all over the world; (5) physical methods of treatment represent a tendency away from scientific psychology. Here I would like to add a new point—which is that the chief indication for E.C.T. seems to be involutional melancholia and the lesser depressions.

Now, *depression is the illness of valuable people.* At the borderline depression is the breakdown of people who are overburdened with responsibility or loss. On this side of the line is the valuable person, often a good mother, who burdens herself with too much concern. On the other side is the same phenomenon, but less conscious, and this is depression. In depression at least the patient suffers for her own illness. E.C.T. is at present being applied to the valuable people, and if this is recognized it no doubt makes the psychiatrist very concerned indeed as to his own suitability for his task. Few of us are innocent of depression, and if we have escaped it we may have done so by a contra-depressive defence which is more abnormal than the frank depression phase of a patient.

Psychological Effects of Convulsion Therapy

Having thus summarized my prejudice I would like to give my guess as to the future developments in the psychology of convulsion therapy. I think that psycho-analysts and those trained in that sort of way should work at present on the assumption that all the results of E.C.T.—good, bad, and indifferent—are psychological results. The immense field of the psychological effects of the idea of E.C.T. has been seriously neglected. To discuss this it is not necessary to have given E.C.T. to a thousand patients, or indeed to have given any at all. What we need to do is to pool experiences of the feelings and ideas found during analysis of patients who have had convulsion therapy, and of patients who are in touch with fellow patients who have undergone convulsion therapy.

Need for Research

I give two lines of approach. The subject that urgently needs research and discussion is that of the patient's conscious and unconscious reactions to (*a*) the idea of E.C.T., etc.; (*b*) the experience of submission to convulsion therapy; and (*c*) the actual fit. Here are some suggestions.

(a) *Reaction to the Idea of being given a Fit.*—I suppose a *normal* person hates the idea. It must be for this reason that psychiatrists do not have fits given to themselves whenever they feel a bit depressed. *Anxious* people are likely to be able to become frightened at the *idea* of the fits, in the same way as they can become frightened at the idea of anything. In contrast they may be especially brave in relation to the actual experience. *Obsessional* patients' difficulties are greatly increased when the idea of convulsion therapy is put before them. The organized defence against spontaneity and uncontrol is liable to be strengthened. Obsessional doubt is liable to find a setting in the problem whether to give or to withhold permission. Guilt will be felt whichever line is taken. In organized *paranoia* the fits are easily felt to be part of the hostile attack that is expected. In one patient, a girl who had a delusion that someone was trying to destroy her brain, this form of therapy was felt to be absolute confirmation of her delusion. In cases with thought-transference delusions and the fantasies that so readily get mixed up with theories of electrical phenomena and malicious influence, it can well be imagined that electrical shock therapy has a special significance.

(b) *Reaction to the Experience of being given Fits.*—In cases with a tendency to *conversion hysteria* a partial knowledge of brain-functioning is easily used in rationalization of paralyses and paraesthesiae following convulsion therapy. *Depressive people* equate the convulsion with dying, and easily feel absolved by having experienced what it is like to meet death. They hanker after convulsion therapy. In some cases each successive convulsion becomes more dreaded, and the last one is equated with death, and recovery from it gives a new lease of life because of the emotional experience. *Suicidal* impulses can be met by the convulsion. By this seeming experience of death a suicidal patient can use convulsion therapy as an alternative to suicide. This is comparable to the relief that a suicidal patient can get through a genuine suicidal attempt—one from which the patient recovers through successful intervention.

(c) *Reaction to the Fit Itself.*—In what may be called *introversion neurosis* the patient has organized a secret inner world in which relationships are good, and this has been done at the expense of trust in the external world in which are placed the bad relationships. It is probable that in these cases the actual fit is felt as a threat to the artificially good inner world, and in consequence a rearrangement has to take place with less complete secret hoarding of good relationships within.

This approach is tentative and admittedly incomplete, but I give it to indicate the way the results of shock therapy may be examined as psychological phenomena. It is just here that research is most urgently needed. Curiously enough, it is also just here that there is an unwillingness on the part of practitioners of convulsion therapy to investigate. Much of the objection to convulsion therapy would disappear if the mechanism by which results are obtained were understood. The main trouble is that false theories are built around the assumption that the mechanism by which change is brought about is a physical one, and these theories have already paved the way for the wide employment of leucotomy—and who knows what may follow?

Society's Unconscious Reactions to Insanity

I also want to put forward the idea that these physical therapies express society's unconscious reaction to insanity. This is by far the most difficult thing I have to say. I have reason to believe that the good results that can come from these physical therapies depend on this—that by them expression is given in an acceptable (because hidden) form to the unconscious distress society experiences in face of mental illness. By unconscious I really mean unconscious, and I mean repressed and unavailable to consciousness. Massive guilt feelings and fear and consequent hate are roused in people who are concerned with mentally ill persons, and I think this unconscious hate also underlay the cruelty to mental patients that notoriously coloured the management of the insane up to recent times.

Tail-piece

As a last word I would like to say why I have no hope that these arguments will make any sudden difference to the now established practice of psychiatry. Mental disorder can be maddening to nurse. Abolition of shock therapy to-morrow would place on the doctors and nurses of mental hospitals an emotional burden which they could not suddenly take, and there will be those who claim that this alone justifies the method. I see this argument, and respect it. Nevertheless, there seems to be a need for someone to register a strong objection to easy and seductive methods which tend to lead away from the difficult path that must be walked by those who try to understand human nature and to eschew magic.

The Psychoanalytic Clinic for Training and Research of the Department of Psychiatry, College of Physicians and Surgeons, Columbia University, 630 West 168th Street, New York, offers a three-year graduate residency training programme in psycho-analytic medicine to qualified physicians. The programme is based on the student's analysis and on hospital and clinic material for psychoanalytic work, and includes lectures on Freud's work, psychodynamics, psychosomatics, experimental analysis of animal behaviour, technique, growth, and development, comparative analysis of cultures, methodology, and theoretical and practical training in psychiatry. Upon fulfilment of the training requirements students will be awarded a certificate of training in psycho-analytic medicine. Those students who, in addition, undertake satisfactory research and pass a supplementary examination in the related basic sciences may also be awarded the degree of Doctor of Medical Science. Applications for training are accepted throughout the year.

BRITISH ASSOCIATION AT DUNDEE

The first annual meeting of the British Association for the Advancement of Science to be held since the outbreak of war cut short the Dundee meeting in 1939 is to take place, again at Dundee, from Aug. 27 to Sept. 3. Sir Henry Dale, the president, has announced that in order to emphasize the positive contribution of science to human progress the programme would conform to the general theme of "Swords into Ploughshares." His own address under the title "Science in War and Peace" and the other lectures and papers would be devoted to reviewing the wartime achievements of science and their application to peacetime purposes. Before the war the meeting of the British Association was the outstanding occasion for the publication of scientific achievement. Unlike specialist scientific societies it sought a public platform while still maintaining a high level of presentation and discussion. There have been occasions when important discoveries have been first announced at British Association meetings, though Sir Henry Dale did not know that that was likely to occur on this occasion; but war, he said, has given an artificial stimulus to scientific development, and the Association has an enhanced function in making people conscious of scientific advance and its possibilities for the community.

Thirteen sections have been arranged. Those of physiology, psychology, and anthropology, are to be presided over respectively by Prof. Winifred Cullis, Dr. S. J. F. Philpott, and Prof. C. Daryll Forde. In the Section of Physiology there will be discussions on aviation physiology and on climate and health. The Sections of Physiology, Psychology, and Education are to combine for a discussion on "Men and Machines." Insecticides is the subject of discussion in the Sections of Chemistry, Zoology, and Agriculture; and the Sections of Chemistry, Physiology, and Botany will unite for a discussion on penicillin and other antibiotics. The new physics will be explored in discussions on the peacetime applications of nuclear fission and on the use of tracer elements, stable and radioactive, in biology and chemistry. U.N.E.S.C.O. is down as a subject for the Section of Education, and there is to be a special meeting of all sections for a discussion on "The Education of the Man of Science." During the Dundee meeting the Division for the Social and International Relations of Science, which arranged a number of important conferences in London during the war, will hold a session on a subject yet to be selected.

A number of scientists have been invited from foreign countries. Three thousand delegates attended the meeting in 1939, and it is hoped that this number will at least be equalled.

SEA AND AIR PORT HEALTH AUTHORITIES

ANNUAL MEETING

The Association of Sea and Air Port Health Authorities of the British Isles held its forty-eighth annual meeting at Belfast on May 13, 14, and 15, under the presidency of Councillor S. K. Henry, chairman of the Belfast Port Health Committee. The delegates were welcomed by the Lord Mayor of Belfast, Alderman W. F. Neill.

Presidential Address

Councillor Henry said the association was originally formed in 1898 on the suggestion of Hull and Goole with the support of six other port sanitary authorities. The membership now included medical and lay representatives from all the principal sea and air port health authorities in the British Isles. Among the more important matters considered by the association in the past year had been the improvement of crews' accommodation, control of imported foodstuffs, hydrogen cyanide regulations, and the effect of the National Health Service Act on the work of port health authorities. The practice of consultation with the Ministries on impending legislation had been continued, and Councillor Henry emphasized the importance of uniformity throughout the sea and air ports.

Port Administration in Glasgow

Sir Alexander MacGregor referred to the influence of the association in raising the status of port administration. Discussing the "convention" diseases, he said that the risk of spread of plague by shipping had been almost eliminated by the world-wide attack on rats in ships, begun after the International Sanitary Convention of Paris (1926). But at Glasgow, as at New York, there had been an increase during the war. Vigilance must be maintained, since plague might appear again as it did in 1896 and the following years.

Smallpox had frequently invaded this country in recent years but had never obtained a real foothold. Whether it had died out because of a rapid loss of capacity to infect or because of the precautions taken was an open question. Experience of the Glasgow outbreak of 1942 had led him to discard the one-stroke in favour of the three-stroke vaccination, and to pay particular attention to the revaccination of those contacts in whom the first attempt at protection had been unsuccessful.

Recent advances in the construction of crews' quarters were worthy of note. A big step forward had been taken by the Board of Trade in its instructions to surveyors in 1937 and 1944. Vessels were being built on the Clyde and elsewhere with high standards of design and equipment for the health and comfort of the crew. Good construction implied "good housekeeping" on board, in which the co-operation of the seamen was essential. He advocated for officers a short course of instruction in ship hygiene, food, first-aid, and the treatment of venereal disease. Seamen of whatever nationality should be assured of prompt and convenient hospital or outdoor treatment at the major ports as part of a joint welfare and medical service.

International Health

Dr. Melville Mackenzie outlined the work of the Pan-American Sanitary Bureau, of the Office International d'Hygiène Publique, and of the Health Organization of the League of Nations. He described the creation and achievements of U.N.R.R.A., many of the functions of which had been taken over by the Interim Commission of the World Health Organization. The World Health Organization had also set up expert commissions on the nomenclature of the causes of morbidity and death, habit-forming drugs, malaria, biological standardization, epidemiological work, post-vaccinal encephalitis, the immunity reaction in smallpox, venereal diseases, and other subjects.

Crews' Quarters and Food

Dr. T. Lloyd Hughes said that for many years the standard of accommodation in British ships had often been much inferior to that found in vessels of some of the foreign countries, particularly the Scandinavian. Instructions issued by the Board of Trade in 1937, together with those published by the Ministry of War Transport in 1946, insisted upon a higher standard and had resulted in many improvements. Even so, there was need for further legislation. He suggested that the crew's quarters should be aft, as this allowed for a better lay-out than was possible when the quarters were situated forward. Individual cabins were desirable, but in any case no more than four members should share a cabin, and there ought to be separate accommodation for each watch. Bunks should be made of polished wood without cracks or crevices, to avoid bug infestation.

Dr. Hughes condemned the use of coal stoves as being both dangerous and dirty, and recommended hot-water radiators. Ventilation of the quarters was important, and forced-draught ventilation was the method of choice. The provision of cupboards, wardrobes, and comfortable furniture would improve the living conditions of merchant seamen. There should be running hot and cold fresh water for officers and crew alike, with ample provision of shower-baths. Laundry facilities and separate mess-rooms with specially appointed stewards were long overdue amenities.

Concluding, Dr. Hughes drew attention to the fact that the inspection of ships' provisions was the responsibility of the Ministry of Transport. The services of the trained port health food inspectors had not been utilized. In his opinion this responsibility could, and should, be passed over to the port health authorities.

Sanitary Control of Foreshores

Dr. S. Barron described the public health problems met with in the early years of the present century in connexion with the sanitary control of the foreshores of Belfast Lough. These

problems arose from the contamination by sewage of the waters of the Belfast port. In 1908 the Belfast Health Commission reported on the high incidence of typhoid fever which had prevailed for many years, and the nuisance of offensive smells from decomposing seaweed on the foreshores. The growth of the seaweed (*Ulva latissima*) in the polluted water was encouraged by the free ammonia content of the sewage effluent.

The high incidence of typhoid fever was attributed to the consumption of sewage-polluted shellfish gathered from the foreshores. It was probable that the sewage derived its specific infection from the large number of carriers. These problems were ultimately solved by the provision of a proper system of sewage disposal.

Health Control at an Air Port

Dr. W. G. Swann referred to the fact that the Public Health Aircraft Regulations, 1938, made under the Public Health Act, 1936, were not applicable to Northern Ireland. These regulations had been designed to conform with the International Sanitary Convention for Aerial Navigation, 1933. There had since been a further convention, in 1944, and it was likely that the existing regulations would be modified at an early date to conform with the new recommendations.

Dr. Swann summarized the methods of sanitary control of infected aircraft and aircraft from infected areas. The procedure included the medical inspection of passengers and crew, isolation of infectious cases, quarantine and surveillance of contacts, and the disinfection and disinfestation of articles and aircraft. He also listed the aerodromes recognized under the International Sanitary Convention.

There had been some changes in procedure in connexion with the arrival of aircraft from yellow fever areas in countries where the conditions might be favourable to its dissemination. These included the compulsory disinfection of the aircraft, and for passengers, failing the possession of a valid anti-yellow-fever international certificate, isolation in screened quarters over the incubation period. As a safeguard against smallpox the Convention permitted isolation for a period up to fourteen days where the medical officer indicated that there was a grave risk of infection.

In the course of the meeting members were entertained by the City Council of Belfast and by the Government for Northern Ireland, and they also visited many places of interest.

Reports of Societies

HOMOSEXUALITY

A joint meeting of the Medico-Legal Society and the Section of Psychiatry of the Royal Society of Medicine was held on April 8 for a discussion on the social problem of homosexuality. Prof. AUBREY LEWIS presided.

Dr. E. A. BENNET said that among homosexuals there was every variety of character. The attitude of homosexuals towards their inversion varied; many of them regretted their exclusion from normal family life. Doctors and lawyers tended to think of homosexuals as unstable; but it was unwise to generalize, and it was doubtful whether social instability was commoner among them than among others. The number of persons found guilty of homosexual crime was, of course, only a small proportion of the homosexual population. The number of homosexuals in this country was not known. Havelock Ellis had mentioned 2%, similar to the proportion of inverts in other lands, and this would account for nearly a million. A fact-finding investigation was badly needed. The social problem of homosexuality was of such importance that a representative committee should be set up immediately to accumulate information concerning the number of homosexuals, the significance of constitutional and hereditary factors, the effect of environment, and the results of psychiatric treatment. Those who had to form programmes of sex education would be helped by such a fact-finding survey. There was no accepted criterion of homosexuality; it had many forms and degrees. Nor was there any acknowledged standard of treatment. In women homosexuality was probably as common as among men, but it was less prominent, received less attention, and was not affected by the social and legal strictures which compelled discretion in the other sex. He also referred to the loneliness of the homosexual, who was compelled to seek the society of others like himself or to live in emotional isolation.

Moral Indignation

Dr. H. MANNHEIM said that society should treat as crime only such behaviour as was distinctly antisocial—that is to say, harmful to the community at large. A strong feeling of indignation was not enough to justify judicial action. Many types of behaviour in political, religious, and other spheres aroused public indignation but were not treated as crimes. From Henry VIII until 1763 homosexuality came under ecclesiastical law, and was regarded as identical with heresy, which might explain much of the moral indignation and consequent stigma it occasioned. It had been suggested by medical psychologists that in certain cases a cure could not be effected without an element of public condemnation and repression. There might be cases of that kind, but the speaker doubted whether successful treatment was in itself a justification for a sentence of imprisonment; cure might be bought at too high a price. His conclusion was that homosexual activities should be punished as crimes only if they tended to corrupt young persons or were carried out for gain—as, for example, male prostitution. In his view the criminal law should not be extended beyond that. He also discussed the effect of prison or institutional life upon homosexual tendencies. It was a question whether it might not be possible to reduce the rigidity of sex segregation among young people in institutions and so reduce the incidence of homosexuality. Further research was needed, and the experience of other countries should be studied.

Classification

Mr. D. STANLEY-JONES spoke of the need for revising the classification of the condition. Of the congenital or intrinsic type of homosexuality little was known, although certain theories had been advanced in tentative explanation. Physiological homosexuality indicated an individual predisposition, and was rarely amenable to successful psychological treatment. Continental workers had shifted from the view that homosexuality was a process towards degeneration; many now thought it to be a variation, a simple anomaly. The question of moral and legal responsibility could not be evaded by simple disclaimer. A distinction might be drawn between uncontrollable impulses and impulses which could be held in check. The only plea which was recognized as giving sanctuary was insanity, and this could not be applied to the homosexual. But the problem of reconciling the terms of the law with the present rights of the abnormal but not vicious individual was not so difficult as it might appear. Leaving aside the private relations of homosexuals one with another, the only offence, other than blatant importuning, which could come within the law was the seduction of young persons, and this particular type of offence was rarely committed by the natural invert, whose affections almost invariably went out to an adult of his own sex. A fully developed homosexual who had reached psychological maturity would no more think of seducing a small boy than would a normal heterosexual. The seduction of children bore no direct relation to homosexuality as such, but was evidence of a departure from normality or a failure to reach maturity. The homosexual had a just claim to be treated in this respect on a parity with the heterosexual.

Acquired, functional, or psychological homosexuality, as it was variously described, fell into a different category. By far the greater number of wrongdoers were not natural inverts but immature heterosexuals or bisexuals, and the reasonable claim of bona-fide inverts to a just recognition of their rights as a social minority was prejudiced by the actions of others. In contradistinction to the intrinsic type, in the acquired type of homosexual psychotherapeutic measures usually met with success, leading often to complete cure.

Female Homosexuals

Dr. W. NORWOOD EAST, president of the Medico-Legal Society, said that it was misleading to consider homosexuality as being similar in the two sexes. He could not

recall any woman homosexual who had committed murder or had been murdered because she was homosexual, but cases of that kind had occurred among men. It was a further fallacy to suggest that because homosexuality in women was not penalized homosexual offences by men should escape penalty. Women lawyers and doctors coming in contact with female homosexuality were somewhat alarmed at its extent. In some cases there appeared to be a specific inherited tendency. It had been found in males that the most important environmental factor was early seduction by homosexual men; other environmental factors were difficulties in ordinary sexual life, venereal disease, and severe emotional disturbance. There was no reason to believe that the homosexual urge was stronger than the normal sexual urge. Many confirmed homosexuals were perfectly potent in heterosexual relations.

The young male prostitute, as a rule, was not homosexual. He wanted an exciting life or money without the trouble of earning it. The young adolescent male gave up prostitution more easily than the young adolescent female, not because he was more moral, but because the female carried her fantasy further on into life. If the homosexual could be prevented from menacing public security and be relieved by medical or social aid he need not be sent to prison; but there were cases in which such a course was too risky, and in these imprisonment might be advantageous. Favourable conditions were youth, a good personality, a first offence, no homosexual habit, a genuine anxiety to overcome the tendency, co-operation with the psychiatrist, and good health. The time was far distant when penalties for homosexual offences could be abolished, and if the homosexual debauched a young child, or offended against public decency, or carried out his activities for gain, or accosted other persons, it was right that he should be penalized.

Prison Experience

Dr. J. C. MACKWOOD said that some individuals who had broken off treatment outside prison had done well during a subsequent prison experience. The value of psychotherapy in prison was quite definite. Much of the machinery of prison life was out of date, but during the four years for which he had been doing this work he had seen a number of improvements take place inside prison. One of the greatest handicaps was lack of space in prison for the expression of healthy energy; another was the long hours of isolation for individuals whose main trouble was that they were already isolated personalities. Signs of improvement were: alteration in individual bearing and demeanour; acceptance of ordinary prison regime; improvement in relationships between individuals; and great liberation of energy. Follow-up after prison was difficult, the more so because the prisoner wanted his prison life to be a closed book. Dr. ALBERTINE WINNER said that it should be realized that the average lesbian did not regard her condition as abnormal at all or different from that of other people; only in a small proportion of cases was she promiscuous. Dr. STAFFORD CLARKE said that the question of punishment depended on whether homosexual activity was criminal in the sense that it interfered with other individuals.

Dr. CLIFFORD ALLEN said that the correct view to take of homosexuality was that it shaded off into heterosexuality; there was no clear-cut division. In his experience homosexuality was mixed up with other perversions. Prison was the worst possible place in which to treat homosexuality. Segregation from the opposite sex encouraged the condition. Psychotherapy would produce good results in a patient who wanted to be cured. In Germany homosexuals were castrated. In America leptazol was used as a form of therapy; he had also seen a number of cases which had received electrical treatment, but they had been failures.

RHEUMATIC DISEASES

SAMUEL HYDE MEMORIAL LECTURE

The Samuel Hyde Memorial Lecture was delivered to the Section of Physical Medicine of the Royal Society of Medicine on April 9 by Prof. HENRY COHEN.

Prof. Cohen began by referring to recent surveys which showed that one-sixth of the total industrial invalidism in England and Wales was ascribed to rheumatic diseases. From a United States survey it appeared that over 5% of the total population suffered from some form of rheumatism. These surveys furnished only a general impression of the prevalence of the disease, but all of them suggested its great extent. In rheumatic diseases the greatest care was needed not only in interpreting the results but in planning large-scale surveys, and the closest co-operation between statistician and clinician was required.

Nomenclature

The question of nomenclature also must be clarified. "Rheumatism" and "gout" had sufficiently strong historical roots to survive outmoded pathology, but many names given to the group of rheumatic diseases failed to describe them properly. He suggested that the names should be associated with the anatomical sites of the disease, even though this might bring in conditions not usually associated with rheumatism. Rheumatic fever had a distinctive feature in cardiac involvement, even though the aetiology was obscure, but such terms as fibrositis, neuritis, strains, and adhesions were often the refuge of the diagnostically destitute.

The gap between the incidence of rheumatic diseases and facilities for treatment, Prof. Cohen continued, would take years to bridge. The reason for the neglect of rheumatic diseases in the past had been, in the first place, that rheumatism was not a fatal disease. It ranked fourteenth in the causes of death, and it lacked the dramatic appeal of cancer, tuberculosis, and heart disease—an appeal which attracted the philanthropic. Yet no Government could view with unconcern one of the major causes of industrial invalidism. Again, the treatment was less spectacular and less overtly rewarding than in other diseases; even the best results often left the patients with fundamental disabilities and deformities. There had also been a lack of co-operation between physicians, orthopaedic surgeons, physiotherapists, and others whose team work was necessary if maximum recovery was to be secured. Neglect by the competent had left the field too widely open to the incompetent. Sufferers had succumbed to the blandishments of the unorthodox, and the law had permitted the sale of nostrums, which maintained their reputation because the natural remissions obtaining in most rheumatic states were attributed to their use.

In the students' curriculum no adequate place had been given to the study of rheumatic disorders. The student might be able to diagnose many advanced types correctly, but his knowledge of early cases and of the various forms of arthritis, the possibilities of treatment, and the value of orthopaedic measures, of occupational therapy, and of rehabilitation was apt to be far from adequate.

Four Directions for Action

These considerations called for (1) research, (2) planning of a comprehensive service, (3) greater interest on the part of the medical student and practitioner in the scope and diagnosis of rheumatic diseases, and (4) opportunities for those who wished to specialize in this field. Research, closely associated with medical schools and hospitals, should cover all aspects of rheumatism—in the laboratory, the field, and the clinic. The incidence of rheumatism in miners, dockers, and postmen, for example, should be studied. In the case of the miner, what were the effects of humidity in mines, of posture, of deprivation of sunlight, and of faulty housing? The influence of hours of work, of psychological factors, of rest periods in relation to prophylaxis should be investigated. Many fundamental problems needed elucidation, and new problems continually presented themselves with discoveries in other fields. More basic investigation into the mode of action and effects of the methods employed in physical medicine was called for.

Hospital beds in which patients could remain, if need be, for months, and clinics where minor forms of rheumatism could be treated and ex-hospital patients continue to receive attention, were needed. Diagnostic and research centres should be set up in the teaching and the larger general hospitals, each of them linked with out-patient clinics and providing short-stay beds for investigation.

The challenge, Prof. Cohen concluded, lay in the incidence of rheumatic disease, the present inadequate understanding of

it, and the basic neglect. The opportunity which this challenge presented came with the introduction of the National Health Service, which promised to every citizen the treatment he needed, but the opportunity was also a heavy responsibility for medicine. Even with present knowledge, if there were sufficient hospital beds and adequate treatment facilities the invalidism resulting from rheumatism could be greatly lessened.

Correspondence

International System of Weights and Measures

SIR,—In his letter (May 3, p. 613) Dr. D. A. K. Black is presumably referring to the method of recording volume in results obtained from the haemocytometer. As the haemocytometer is calibrated in linear measurements the volume is derived from these measurements and should be expressed in terms of the cube of the unit of linear measure—in this case the cubic millimetre. I pointed out in my article that the cube of a linear measure is a valid mode of expressing volume when the volume has been determined from linear measurements.

Mr. H. V. Stopes-Roe in his letter (p. 613) is correct in expressing volume as a cube of linear measurement if the volume has been actually determined from linear measurements, but it should be made quite clear that such is the case—that, for instance, the cubic centimetre which he uses is actually a cubic centimetre and is not used as an alternative to the millilitre. Although the expression of volume as a cube of linear measure is a valid procedure when it has been determined from linear measurements it is not nearly so simple to determine the volume of a container from linear measurements as it is to determine the weight of water required to fill it. Consequently units of volume came into existence defined in terms of the space occupied by a definite mass of water under specified conditions. The litre is the space occupied by a kilogram of water at its maximum density. This definition has the additional advantage that the kilogram, litre, and millilitre are interrelated, whereas the cubic decimetre and cubic centimetre are not related to the kilogram.

There is some obscurity in the following sentences from Mr. Stopes-Roe's letter. "It is a purely legal form (like the gallon) that the ml. ever got started; scientists writing scientific articles should refer to the cm^3 . . . unless they are *actually* and *significantly* using the millilitre. If they be writing legal reports they should use throughout whatever odd units—yard, drachm, or litre—that may be legally required." If I understand Mr. Stopes-Roe correctly, I agree that scientists should use the term "millilitre" when they are "actually and significantly" using the millilitre; on the other hand, they should use the term "cubic centimetre" only when they mean volume derived from linear measurement. Both these modes of measurement have scientific validity when used strictly in accordance with their definitions; they are also both legal measures when used in their proper meaning.

As regards publication, surely the description of units of measurement should depend upon the units actually used and not upon whether the publication "wishes to be scientific or legal."—I am, etc.,

London, W.14. J. M. HAMILL.

Tuberculous Pericarditis

SIR,—We read with interest Dr. Harry Kopelman's article on tuberculous pericarditis (April 26, p. 559). Of over 1,400 consecutive cases admitted to the pleural effusion unit of this hospital since 1942 six were complicated by pericarditis—an incidence of less than 0.5%. The diagnosis of tuberculosis was proved bacteriologically in three cases, and was made on strong presumptive clinical grounds in the remaining three. Three patients were males and three females. There were three deaths and two recoveries, one patient still being in the acute stage of the disease. The following is a brief summary of the case histories.

Case 1.—A man aged 24 years, of Irish descent, was transferred to this hospital, convalescent from a left pleural effusion and suffering from a serous pericarditis, in May, 1942. Tubercle bacilli were grown from the pericardial fluid. He made an uninterrupted recovery, and was discharged in October of the same year. Two years later he was known to be alive and well.

Case 2.—A man aged 22 years was transferred to this hospital from Bath in April, 1944, suffering a right pleural effusion complicated by a gross pericardial effusion. He had signs and symptoms of severe circulatory embarrassment. He was tapped repeatedly, with air replacement. Viable tubercle bacilli were repeatedly obtained from the pericardial fluid in spite of intrapericardial injections of "promanide." He was transferred to a sanatorium in August, 1944, and died there two months later.

Case 3.—A man aged 22 years, of Italian descent, was transferred to this hospital in June, 1943, suffering from a sterile lymphocytic pleural effusion on the right side. He relapsed in January, 1944, developing a pericarditis with loud friction sounds and little alteration of the cardiac shadow. He made an uneventful recovery and was discharged in June, 1944. Six months later he was re-examined, and, apart from some slight pleural thickening on the right side, was found to be well.

Case 4.—A girl aged 16 years was transferred to this hospital in April, 1943, with a sterile lymphocytic effusion on the right side. There was a strong family history of tuberculosis. Her effusion cleared, but in July, 1943, she developed an acute pericarditis with effusion. Paracentesis was twice performed to relieve distress, pale greenish fluid being obtained which was sterile on culture. She deteriorated rapidly and died on July 31, 1943. Permission for post-mortem examination was not granted.

Case 5.—A married woman aged 23 years developed a pleural effusion on the left side following the birth of her first baby in February, 1944. She was transferred here in March, 1944. On admission she was still febrile, and was acutely ill. In the middle of April she developed an acute pericardial effusion. A paracentesis showed a serous fluid, from which tubercle bacilli were grown. She deteriorated rapidly and died on May 12, 1944. Permission for necropsy was not granted.

Case 6.—An unmarried woman of 25 years was admitted to this hospital in February, 1947, suffering from a right pleural effusion. She was still pyrexial on admission. Eight weeks after her admission she developed precordial pain and a sensation of constriction in the chest. A loud and definite pericardial friction rub then appeared and has persisted since. There is no evidence of a pericardial effusion of a significant size. She is still in the acute stage of the disease.

Tuberculous pericarditis is thus seen to be an uncommon but not rare complication of tuberculous pleural effusion, and to be a disease with a variable course and prognosis, though the latter is grave.

We would like to thank Dr. Clifford Ellingworth, medical superintendent of Queen Mary's Hospital, Sidcup, for permission to publish these case reports.

—We are, etc.,

Queen Mary's Hospital, Sidcup, Kent. E. MONTUSCHI. T. L. REEVES.

Tuberculosis and the N.H.S. Act

SIR,—I much appreciate the views expressed by Dr. G. Lissant Cox (April 26, p. 577) regarding tuberculosis and the N.H.S. Act. These are the opinions of a distinguished tuberculosis worker "in the field" who has recently earned a well-deserved retirement.

As one who has had an experience of over thirty years in this centre, directing measures for the control and elimination of tuberculosis, and who for the six war years assisted a powerful medical officer of health in his department, I foresee the grave danger of a cleavage between the hospital service, particularly as regards tuberculosis and mental welfare, and general infectious diseases, and the local authority—the domiciliary service. This cleavage might be obviated by building three bridges—at the centre, at the region, and at the hospital group levels.

At the centre by appointing three committees: (*a*) For tuberculosis, (*b*) for mental health, and (*c*) for infectious diseases. Similar committees at the regional and hospital group levels. Other committees to be formed at the three levels for maternity and child welfare and any other services requiring unification for their successful operation. Each committee to be composed of persons specially interested in that particular subject and guided and advised by "specialists" in that particular subject.

The health visitors of the local authority to act as investigators in the homes along with the sanitary inspectors, and "specialized" health visitors to be attached to the various medical, nursing, and clerical teams operating at the hospital group and local authority levels.

Taking the tuberculosis service as an example. The primary notification of tuberculosis would be visited by the health visitor, who would report on the housing conditions and general sociological circumstances. The primary notification would by law be sent to the local medical officer of health as chief epidemiologist, who would delegate the subsequent measures to the senior tuberculosis officer of the hospital team; the subsequent visits to be carried out by the "specialized" health visitors who attend the various clinics and are kept informed of everything affecting the patient and his family; the senior medical officer of the team to work in close harmony with the medical officer of health, particularly as regards housing and other necessary conditions. So far as after-care is concerned, this should be in the hands of the committee at the hospital group-local authority level and advised not only by the senior medical officer but also by the medical officer of health.

The framework could be extended to meet the needs of all other services, but modified according to the special needs of this service. Once the framework is accepted, the details can easily be filled in provided there is good will and a wide understanding.—I am, etc.,

Bradford. HAROLD VALLOW.

SIR,—There are two facts apposite to the impending changes in the tuberculosis service which have so far received scant recognition. The first is that the relationship of the patient to his domestic, social, and economic background, which is now receiving so much attention and which to general medicine is a relatively new conception, has in fact been the everyday concern of the tuberculosis officer for many years. Secondly, the anti-tuberculosis organization as it has developed since 1914 has given us the nearest approach we have known to a public medical service providing hospital, clinic, and domiciliary treatment at a high clinical level for sick persons in large numbers. Despite certain inherent weaknesses and inequalities, and despite in some quarters official apathy and parsimony, it has emerged with a record of which it may well be proud.

For these two reasons the views of tuberculosis workers claim the special attention of those who will formulate the new regional schemes. It is to be hoped that the well-timed suggestions put forward by Dr. Lissant Cox (April 26, p. 577) will stimulate a lively discussion prior to the Minister of Health's address in July. Dr. Lissant Cox rightly stresses the need for medical teamwork. This can only be obtained where all concerned are responsible to the same employer. If only one person—for instance the health visitor—owes allegiance to a different authority from that of the tuberculosis officer, almoner, and clerk there is a sense of divided loyalties and the team spirit suffers accordingly.

Each tuberculosis area within a region will require a headquarters with office accommodation It will be years before new establishments are available, and until then I suggest that in some areas the smaller institutions could, with minor alterations or extensions, be adapted for this purpose. Beds would continue to be available as before, and in those institutions where *x*-ray facilities are already provided out-patient clinics could be held as in country districts; this would be an added convenience for patients. In this way the institution would become a strongly defined centre, clinical and administrative, for the area.—I am, etc.,

Chichester. J. E. WALLACE.

Sanitary Control of Ice-cream

SIR,—May I draw your attention to an inaccuracy in the epidemiological note (April 26, p. 583) on the above subject? The maintenance of a sufficiently low temperature after freezing and until sale is required in the case of a cold mix product as in the case of a pasteurized mix. Circular 69/47, which was issued with the regulations, points out in respect of the complete cold mix that after conversion of the reconstituted product into ice-cream Regulation 4 shall apply.

This regulation forbids the sale or offer for sale unless one of two conditions is met. One requiring further heat treatment should the temperature of the ice-cream be found to be above 28° F. (−2.2° C.) cannot obviously apply to the complete cold mix product; the other stipulates that ice-cream shall not be sold unless it has been kept at a temperature not exceeding 28° F. since it was frozen.

I should be grateful if you would draw the attention of your readers to this rather important aspect of ice-cream control.—I am, etc.,

Birmingham. W. R. MARTINE.

Massive Penicillin Doses

SIR,—Dr. D. P. Wheatley (April 19, p. 530) has shown that the daily parenteral administration of penicillin can accelerate the resolution of localized septic foci if the doses are large enough. Thus, for the treatment of what he calls "seven cases of minor conditions commonly met with in general practice" he used 4,550,000 units of penicillin. The total period of convalescence from the commencement of treatment was at least 30 days.

From the few cases that I have treated I have been under the impression that a more rapid cure can be achieved by the combined used of local penicillin and free surgical drainage. The solution recommended for local use by Roxburgh contains between 500 and 1,000 units per ml. of distilled water and gives satisfactory results. In one case a pyogenic abscess of three days' duration was opened by a 1-in. (2.54-cm.) incision, and a cavity 1/2 in. (1.25 cm.) in diameter was found. A drain was inserted and penicillin was instilled. Twelve hours later the discharge was slight, and the drain was removed. On the fourth day, after daily instillations of the penicillin solution, the cavity was obliterated and the skin incision was clean and dry and healing rapidly. (Total amount of penicillin used was 4,000 units.)

If, as Dr. Wheatley has noted, the systemic treatment with penicillin is commenced early enough, the inflammation will abort. But, in cases where there is some delay in starting treatment, the generalized symptoms of toxaemia and the signs of inflammation will subside, leaving a localized collection of pus which requires surgical treatment. It is suggested that, once it is decided that the inflammation is progressing to abscess formation, but before localization is complete, the area should be incised to relieve the local tension and pain. The level of penicillin in the blood stream will prevent a spread of infection through the channels opened up by the incision. Thereafter the systemic penicillin may be discontinued as soon as the general condition of the patient merits it—usually three injections of 30,000 units each is the total amount of penicillin required. The local treatment is continued daily until the purulent discharge ceases, when the further treatment is the same as for a clean surgical wound. Such a procedure, however, could only be justified if the organism is sensitive to penicillin. This can be assessed by the progressive localization of the inflammation under the systemic treatment.

In this way greater economy in the use of penicillin can be achieved, the discomfort of repeated intramuscular injections is reduced, and the patient's convalescence is shortened. In addition it is suggested that a stronger scar and a better cosmetic result is achieved because the tension of the abscess is relieved before the overlying skin has become stretched and atrophic.—I am, etc.,

Ayr. C. O. KENNEDY.

REFERENCE

Penicillin: Its Practical Application (Dermatological Section). Edited by Sir Alexander Fleming. London: Butterworth and Co. 1946.

Rubella in Pregnancy and Congenital Defects

SIR,—Because of the interest taken in this association this single case may be worth publishing. It was the mother's first pregnancy and resulted in a normal full-term delivery, birth weight, 5 lb. 9 oz. (2.5 kg.). The boy was born on Jan. 14, 1947, and was seen for the first time a month later at an infant welfare centre in South London, when his mother was having considerable difficulty in getting him to suck satisfactorily. He was found to have bilateral cataracts and a loud systolic murmur heard over the whole left chest; he was never cyanosed. He

reacts sluggishly and appears to be deaf. He has progressed slowly and is now, at the end of April, 8 lb. 10 oz. (3.88 kg.).

The father is 29 and healthy. His sister had rheumatic carditis at the age of 14 and his father had a "displaced heart," which never made him ill. The mother is 22 and robust. On inquiring about her health during the pregnancy she said that she was very well except that she "caught German measles from her sister during the first month." The attack had apparently been mild and had not made her feel at all unwell. The Wassermann reaction, taken at the antenatal clinic, was negative. Her sister and the other members of her family, father and mother, are all well.—I am, etc.,

London, S.E.21. G. D. PIRRIE.

Treatment of Post-operative Pulmonary Atelectasis

SIR,—In an effort to prove that his pen is mightier than the spear, Mr. R. C. Brock, in his letter (April 19, p. 543), out-Quixotes Quixote by tilting at illusory windmills. Indeed, all must agree with practically everything he says, but the tone of his letter requires that I should explain myself in rather more detail.

In saying that bronchoscopic aspiration is the ideal method of treating post-operative atelectasis I of course meant that it was the most effective (as Mr. Brock himself admits), not that it had no imperfections; nor must he condemn me as ignorant of the well-known benefits of prophylaxis and of conservative methods of treatment simply because, in describing one particular manœuvre (this word suggests less of charlatanism than "trick"), these benefits were not stressed; nor, of course, is it material to that manœuvre whether water be introduced into the trachea by injection through the windpipe or by instillation through the glottis, so long as coughing results. Incidentally, injection is not so unpleasant as it sounds, and there is little to choose between the two methods.

On all the above points Mr. Brock and I are in agreement. Where we really differ is on his statement that the objections to bronchoscopic aspiration are, first, that it encourages laziness, which might more reasonably be used as an argument against penicillin or the sulphonamides, and, secondly, that bronchoscopy is dangerous in unskilled hands. This latter may be true, but it is no more an argument against bronchoscopy than it is against appendicectomy; on the contrary, it is an extremely good reason why anaesthetists should become, as I said in my last letter, experts in bronchoscopic aspiration and in thoracic disease.—I am, etc.,

Newcastle-upon-Tyne. M. H. ARMSTRONG DAVISON.

Treatment of Ingrowing Toenail

SIR,—I was very interested to read the remarks by Dr. S. J. D. Esser (Jan. 4, p. 33) on the above subject, and entirely agree with him. I have performed a similar operation on over fifty patients, only one of which was temporarily unsatisfactory. The patient, a very conscientious engineer officer, would not remain in bed but got about immediately, with the result that convalescence was delayed. Some of my more athletic patients played football a month after the operation with no ill effects.

I first came across a description of the operation in question some years ago in a French medical journal; the writer was a French surgeon; unfortunately at this date I cannot recall his name. In his description a diamond-shaped portion of the soft tissue is removed, the knife cutting down to the bone; three salmon-gut sutures are inserted—the end ones being tied first, the middle one last—and there should be little or no tension. Performed in this way the final result is a linear scar, the overhanging soft tissues being drawn well away from the lateral margin of the nail. He emphasized the importance of a thorough preparation of the part prior to operation and insisted on complete rest afterwards until removal of the sutures. This, although rather irksome to the patient, is essential if a good result is to be obtained.

Following these instructions I have never had to perform a second operation for the relief of this condition. As Dr. Esser says, there is no doubt about the operation being simple, logical, and effective, and I congratulate him on bringing it to the notice of the profession.—I am, etc.,

Sydney, Australia. W. E. ROBERTS, Surgeon Commander, R.A.N. (retd.).

Safety in Electric Convulsion Therapy

SIR,—I have read the letter by Dr. R. A. Sandison (April 26, p. 579), and I am very gratified by such common-sense thought. His experience is entirely in accord with my own over seven years' experience of electric convulsion therapy. I have treated a large number of cases both as in- and out-patients by this method in the last two years without traumatic occurrence, and between 1940 and 1945 had only three cases which showed evidence of compression of one vertebra after *x*-ray examination. I came to the conclusion that this compression was more a radiological disease than a pathological one, and I have not seen any disability resulting from it.

I always use a firm surface with a pillow placed under the thoracic spine and no other mechanical restraint. It is, therefore, in my opinion quite unnecessary to use curare. As far as lessening the apprehension by means of thiopentone, as Dr. Sandison says, patients are not afraid of the treatment but sometimes are upset by the amnesia and confusion, which as a rule are only transient, and again are very readily relieved by a chat with the patient following treatment, or by warning the patient before that such symptoms may arise for a short time. No advantage, therefore, in my opinion can be obtained by the use of curare or thiopentone apart from the very dangerous results which may follow its use.

Again let me congratulate Dr. Sandison.—I am, etc.,

Bromsgrove. J. P. MCGUINNESS.

The Shortage of Nurses

SIR,—The purpose of this letter is twofold: first, to bring to the notice of the medical profession a very real danger to the future supply of nurses; and, secondly, to ask whether the theoretical training of the modern nurse has not reached the stage when it is endangering the practice of nursing.

It seems to me that the following decision of the General Nursing Council has not received sufficient attention in the medical Press—namely, that as from May 31, 1937, no hospital with less than an average of 100 occupied beds per day will be recognized as a complete training school. By this decision the General Nursing Council would appear to be following the present-day trend of the pursuit of ideologies without regard to the practical issues involved. The law of economics is one of demand and supply; if the supply is inadequate and further demands are put upon it the result must be chaos.

The smaller hospitals throughout this country have for many years supplied a large number of trained nurses. They have instructed and individually spoon-fed girls who, from lack of primary education, would have failed to stay the course in the larger hospitals, and have turned them into reliable nurses. In the future these smaller hospitals can never be staffed by senior nurses, and they will have great difficulty in attracting junior nurses, who will prefer to enter the complete training schools.

It is generally acknowledged that the standard of education of the present-day nursing recruit is not as high as it was ten years ago. Yet with insufficient grounding the nurse of to-day is expected to have a knowledge of medicine, surgery, gynaecology, and many other subsidiary subjects that would not disgrace the average medical student. Of what practical use is the nurse full of theory who cannot make her patient comfortable, and, who, for example, though she can quote correctly the precise figures of the normal blood urea, yet is unable to see that her patient is in the early stages of renal failure by his drowsiness, his breath, his tongue, and his diminished output of urine? The nurse should have sufficient textbook knowledge to enable her to take an intelligent interest in her work. She should be trained not to the theory of medicine but to the art of nursing: the class-room can never replace the ward. In my opinion it will be cold comfort for the patient when a graduate nurse does his dressing, a student nurse gives his enema, an assistant nurse washes him, and an orderly looks after his meals, with a complete change of personnel for every eight-hour shift. Not one of them will look upon him as her individual responsibility, and the faith of the patient will be correspondingly lessened.

It is admitted that the smaller hospital is no longer an economic unit, and that the larger one of 400 to 500 beds is the hospital of the future. At the present rate of building it may well be twenty years before the latter comes into existence.

With the new Health Act the demand for nurses is going to increase. Rightly, the General Nursing Council has the ear of the Government. Does a similar liaison exist between the General Nursing Council and the medical staffs of hospitals who are interested in the supply of nurses—through, for example, the British Hospitals Association? Is this the opportune moment for the General Nursing Council to enforce its decision?—I am, etc.,

Ashford, Kent. JOHN C. HODGSON.

Cement Dust

SIR,—Under the heading "Any Questions?" (April 12, p. 515) your correspondent, in reply to an inquiry about cement dust being injurious to health or not, states that research into the matter has revealed no gross lesion of the lung tissues from the prolonged inhalation of cement dust among those engaged in its production. He says, however, that it may cause irritation of the conjunctiva, skin, the nasal and upper air passages, the latter including, I suppose, the trachea and large bronchi, presumably resulting in conjunctivitis, dermatitis, nasopharyngeal catarrh, tracheitis, and bronchial catarrh. Personally, I have no doubt about its being able to give rise to those complaints. Such being the case, one must conclude that, although not seriously injurious to health, it does not contribute to the maintenance of health to the extent one would like to enjoy it if the air one is forced to breathe night and day were free of cement dust pollution.

It is a well-known fact that in Germany no dust comes out of the factory chimneys. Obviously it is because methods of preventing the emission of dust are made use of. Could not such measures be employed in England for the same purpose, involving as they might highly technical and engineering questions? It is only a matter of expense and of enlisting the services of people who are capable of solving in a practical manner those questions, as it is done in Germany.

Your correspondent obviously does not have to live in districts where air pollution by cement dust prevails. Even if he happened to reside in these districts and were content to make the best of things in the belief that his health would not suffer seriously, I feel sure he would very soon realize the very grievous nuisance a cement-laden air can be and would gladly join in the request that it may be removed.

The Minister of Health, in reply to a letter of mine, once said that cement dust was not *seriously* injurious to health. Nothing that can be prevented should be allowed to exist, even if its effects on health are comparatively slight. If on that account the matter does not come within the purview of the Ministry of Health, it is certainly of such a nature as to call for intervention by the Ministry of Nuisances, if such a Department exists in England, as it apparently does in Germany.—I am, etc.,

Greenhithe, Kent. D. W. STANDLEY.

Child Guidance

SIR,—It is interesting to note that Drs. J. A. McCluskie (April 12, p. 508) and S. Sharman (April 26, p. 580) both agree as to the desirability of the psychiatrist to a child guidance clinic having previous experience in general practice. The authorities seeking such psychiatrists, however, almost without exception demand the D.P.M. or equivalent qualification, which to all intents and purposes means experience of work in a mental hospital.

The latter experience is, I should have thought, almost totally irrelevant to child guidance work, since, as Dr. McCluskie suggests, the large majority of cases coming before a child psychiatrist do not involve any diagnosis or treatment of *mental disease*. They do, however, always present psychological problems—social, educational, and personal. This is an entirely different matter, and demands not experience in the diagnosis and treatment of psychosis but profound knowledge of the dynamics of emotional development from infancy onwards and of the forces which may damage or arrest it, and ability to apply this knowledge sympathetically and realistically.

It is the last word which points to the need for experience in general practice, an experience unique in giving the doctor entrance to the homes in which children are born and grow up. The psychiatric social worker has this entrance, but only in connexion with the immediate child guidance problem, and, valuable as are her "social histories," they will be responded to far more usefully by the man or woman who is familiar with the types of home and situation presented than they can be by a specialist whose experience has been gained in institutions and/or consulting-room.—I am, etc.,

Peppard, Oxon. LAURA HUTTON.

Tobacco

SIR,—If the increased cost of tobacco were really to result in a marked reduction in consumption over a number of years then the question whether we are really a nation of oral eroticists would be well on the way to a solution—or would it? The dentists don't seem to have any vital information to give us about the nation's teeth after 7½ years of enforced reduction in the consumption of sweets and sugar.

Of course there is more to smoking than just sucking. Perhaps the doing without might result in an increased national intelligence instead of the seemingly inescapable decline, which may or may not have had some connexion with smoking. Or will some other mild vice happen along to take the place of tobacco? It is interesting to speculate what this might be save the obvious vices of sweet-sucking and tippling, both of which are at present out of the question. Perhaps potency will be stimulated and the gloomy portents of a shrinking population refuted?

Again—always provided there is a real reduction, and spread over a long enough time, which I doubt—apart from minor physical changes such as increased appetite with little to appease it and slight improvement in vision and wind, my own view is that such a real abstinence with nothing to take its place would result in a very definite restlessness, increased energy, particularly mental energy, intolerance (inability to bear fools gladly), and a dangerous boredom. How I wish it would happen!—I am, etc.,

Thame, Oxon. E. GRANGER.

SIR,—We pay lip-service to preventive medicine. Vast sums of money are to be poured out on the altar of national health; yet all we can do about the tobacco tax is to crave "relief" for invalids, pensioners, etc.

Look again, Sir, with open eyes at the grown man still suckling his pipe; at the yellow-fingered female inhaling between her paroxysms of cough great gouts of acrid smoke into the ramifications of her bronchial tree; peer through the billowing smoke of the theatre auditorium at the serried ranks of smouldering addicts, squashing their stubs into carpet or tray, fiddling with lighters, probing their pipes, and cough-cough-coughing. And then maintain, if you can, that the tobacco habit as practised to-day is anything better than a melancholy commentary on *Homo sapiens*.—I am, etc.,

Uckfield, Sussex. W. R. E. HARRISON.

Occupied Holland

SIR,—The final paragraph of the article on occupied Holland by Dr. Henriette A. Lohr (April 19, p. 540) is perhaps worthy of special consideration. Dr. Lohr writes: "We have learned some things during this hunger period. Even those who didn't get oedema have experienced a curious change in their outlook and behaviour, which varied from complacency and apathy to irritability. Formerly we may have scoffed at the poor for not being able to grasp the many opportunities which life offers to better their conditions. We never realized the fundamental significance of food."

It has been observed in a number of experiments that shortage of a variety of food factors may give rise to subclinical deficiency states marked only by lassitude or irritability. Another mental effect of prolonged rationing may perhaps be illustrated by an example. In the Western Desert during the war water was often very strictly rationed, and it was a common experience for men who had been some time in the desert to feel, when they came out, a strong inhibition against the free use of water. This attitude might last many months, even when water was unlimited. In this country with food short, the prolonged strain of war, and need for self-control so that each might have his share, have I think tended to produce an almost unconscious inhibition. A subclinical state of undernutrition through rationing may be widespread and marked only by

apathy or irritation. In such a state we scarcely realize what we need nor fully appreciate what we miss, a condition which is not conducive to the great effort required for national recovery.

London, W.1. MARTIN HERFORD.

Reshaping the Curriculum

SIR,—I read with keen interest the special article and annotation on the subject of the curriculum (May 3, pp. 606 and 608) and would like to make a few observations.

Might not a course of elementary pathology be given to all students in the London hospitals prior to their entry into the wards, as is done at the older universities? To arrive in the wards with a rudimentary knowledge of disease processes must be very advantageous. Would it not be wiser to arrange for pharmacology to be taught alongside medicine, as it is essentially one of the clinician's handmaids? It does seem that to observe the effects of, e.g., adrenaline or digitalis on a cat in the preclinical sphere is rather to put the cart before the horse. Is it not yet time that dietetics had its rightful place in the academic side of medicine? Few students, one feels, leave hospital with a sound knowledge of dietetic requirements. I suggest that the official hospital dietitians be enlisted to give a simple course of instruction on food values and their subsequent clinical implications. Most patients will usually, somewhat nervously, ask their medical advisers, "Doctor, what can I eat?" In these austerity days of food rations the question has about it an added note of urgency.

Further, medicine, as one of the three great learned professions, should be expounded from the historical standpoint. If clergymen are required to study church history, and lawyers pursue courses in legal history, why not courses in the history of medicine? How many doctors know anything of the ancient origins and thrilling developments of their distinguished art? How many students could say who were Scarpa, Vesalius, Galen, or, in more recent centuries, Pott, Abernethy, Paget, and even Harvey and the Hunters? Singer's *Short History of Medicine* is a fascinating volume.

Finally, could not something be done to standardize the finals, as there is scarcely a month in the year when some examining body is not conducting one of its finals? One feels that there is a good deal of latent friction existing between students taking Oxford and Cambridge degrees, London degrees, and the diplomas of the Royal Colleges and Apothecaries. This staggering of the finals all over the year appears to be very disturbing from the point of view of didactic continuity. Could there not be one final examination, e.g., an M.B., B.S. (England), conducted both in London and the provinces and held twice or at most three times a year? It would be worth giving such an academic experiment a trial.—I am, etc.,

Banstead, Surrey. J. B. GURNEY SMITH.

Medical Exchange

SIR,—The World Friendship Association, of 29, Portman Square, London, W.1, is anxious to hear from medical practitioners who are interested in the following plan: (1) To receive as a guest for fourteen days during August a medical practitioner from Denmark or Holland; (2) to visit during the month of September a medical practitioner in Denmark or Holland and stay with him as his guest for fourteen days.

The cost for Denmark from port of embarkation to destination and return to port of embarkation will be 15 guineas. For Holland the cost will be £9 10s. An additional fee of 12s. 6d. for membership of the World Friendship Association is payable.

The visits will normally be direct exchanges and are contingent upon hospitality being afforded here. The World Friendship Association is an organization which exists to foster mutual understanding by arranging mutual visits. Hitherto its facilities have been available only to school-children and members of youth organizations, but now it is possible to extend them to adults. Practitioners who are interested should write to G. A. Talbot, Esq., World Friendship Association, 29, Portman Square, W.1, and should mark the envelope "Medical Exchange."—I am, etc.,

London, W.C.2. RICHARD W. DURAND.

POINTS FROM LETTERS

The Pemmican Journal

Dr. J. P. S. JAMIESON (Nelson, N.Z.) writes: I cannot forbear from writing to congratulate you and the Secretary of the B.M.A. on the issue of the *Journal* of Feb. 22, 1947, which I consider the finest *B.M.J.* in my experience of nearly fifty years. It is reassuring to know that you had the permission of the Ministry of Fuel and Power and the C.O.I. to use candles and turn the handle of the duplicator. In other than a truly democratic country that might have been refused.

Marriage Guidance

Dr. DAVID R. MACE (London, W.1) writes: Dr. Philip M. Bloom (April 19, p. 552) urges that more attention be given to marriage preparation as the most effective means of tackling marital disharmony by preventing it altogether. In the Marriage Guidance Council we have never been in any doubt concerning the importance of this. In season and out of season we have reiterated this theme. I hope we may claim some credit for the recent change in public opinion from definite antipathy to mild interest. But the heart of the matter lies with the medical profession. We are continually hearing from young people who have gone to their doctors for marriage preparation and been dismissed with the implied suggestion that they were wasting the time of a busy man. Until this attitude is corrected we shall make little headway towards effective preparation for marriage.

A New Outlook Needed

Dr. ALBERT E. NICHOLS (Shrewsbury, Shropshire) writes: The medical system of this nation is in the melting-pot and the resulting conditions will decide the future of doctor and patient for many years. Those of us who are older and know the endless slavery of our past and present lives had hoped that those following us would, in common with all men, have a better life. . . . "The patient comes first" is a noble ideal, but it is responsible for most of our troubles. Our fellow men do not care in the least if the doctor works himself to death. They can get another doctor. . . . We have a duty to our patients and our generation, but let us not forget we have an equal duty to ourselves, our wives, children, sweethearts, and friends. Let us revolt against this life of continuous penance and seek to secure more of the joy of living, with more time for leisure and pleasure, for it is a man's elementary right. . . . Those of us—the majority—engaged in N.H.I. work have in addition a heavy burden quite outside the heavy responsibility of the care of human life. As a colleague put it to me, "We have always to be on guard." The slightest complaint against a doctor is most zealously investigated, while it is quite useless and a waste of valuable time to complain of a patient, who can break with impunity any rule he or she likes. . . .We have now in power a Labour Government, put in by the workers and maintained by the Trades Union Congress. If they are consistent they will give the doctor the same consideration they would give any other worker—an eight-hour day, a living wage, and a right of appeal to the law courts. It is a horrible thing that in these days of so-called human progress men should follow their profession under constant fear of fine or loss of livelihood under the regulations of a Government Department and have no protection from our law courts.

Textbooks for D.P. Doctors

Dr. P. J. SMITH (Area Team 1069, 390 U.N.R.R.A., B.A.O.R.) writes: Excellent work is being done by our D.P. doctors in our hospitals, but they are greatly handicapped by shortage of textbooks describing the recent advances in the many branches and specialties of our profession. In Servatius Stift Hospital, Augsburg, of which I was medical director in the latter half of 1946, are 600 beds, five *x*-ray plants, a chemical and a pathological laboratory; and all branches of medical and surgical work are encountered. The majority of the doctors can read English and would welcome used textbooks or last editions but one. I am sure many of my colleagues have on their library shelves books which, though outdated by a couple of years, would nevertheless be welcomed by our doctors out here. All medical books are needed, but those on medicine and general surgery are most urgently required. However, literature on all specialties would be of service. I will gratefully acknowledge receipt of each book.

"Doctrine"

Dr. A. DESMOND STOKER (Winster, Derbyshire) writes: I received the following note this morning from one of my patients. Am I practising the wrong profession? "Dear Dr., I received this bill from you and would like to know what it is about as my family and myself are all covered to receive Doctrine."

Obituary

E. T. WITHINGTON, M.B.

A few weeks ago at his residence at Oxford and in his 88th year there died, on April 20, as quietly as he had lived, the best medical scholar that this country has seen since the great days of Francis Adams and W. A. Greenhill.

Edward Theodore Withington was born in 1860 at Culcheth Hall, Warrington, Lancs., the younger son of a country "squire." As a child he seemed very frail and so remained through life, but he was singularly free from physical disabilities. He suffered, however, from a very severe stutter which made any sort of public life impossible and prevented him from being known personally beyond a small circle. Nevertheless he acquitted himself well in classics at Harrow and in science at Balliol, where he obtained the Burdett Coutts scholarship. He then spent some time at Berlin University, improving his Greek, and in 1888 entered on a clinical course at St. George's Hospital, qualifying in 1891. After a short time in practice he decided to devote himself to scholarship and began a brilliant series of historical articles in the now defunct *Medical Magazine*, of which he became assistant editor.

Withington early developed an admirable literary style, at once clear and allusive, always warmed by the glow of a gentle happy wit which made all that he wrote most agreeable to read. His extremely thorough work thus became much more palatable than is common with such material. He adhered scrupulously to a rule of going to his sources, in whatever language they might be, and it is thus always safe to rely on his statements. Almost everything that he wrote has some element in it of permanent value and has stood well the test of time. He married in 1897 but was early left a widower and lived for many years with his only daughter. About 1914, on the instance of Sir William Osler, he settled at Oxford, where he lived as a secluded but far from inaccessible scholar until his death. Though his intimates were few, they included Sir William Osler; Dr. A. L. Smith, Master of Balliol; Prof. Stuart Jones; Prof. Ramsay Wright; and Dr. A. G. Little. The author of this notice is proud to have been admitted to this choice circle.

Withington made many admirable contributions to the history of medicine. Five of them are outstanding. First in time was his beautiful *Medical History from Earliest Times*, published in 1894. Scholarship is of its nature a tree the choicest fruit of which matures late; thus such a book is a noteworthy achievement for a man of thirty-four. Nevertheless in the judgment of the writer of this notice it is within the limits of its length and the period that it treats easily the best summary of the subject in English, and he is inclined to think that it is the best in any language. Advances in knowledge in the fifty-three years that have since gone by have outdated some of its statements and generalizations, but in its combination of lightness of touch, comprehensive and penetrating learning, and sane perspective the book certainly takes its place among a very select few.

Another of Withington's major contributions is his well-known essay of 1919, *The History of Greek Therapeutics and the Malaria Theory*. This careful and original account involved much research and is a model of graceful condensation of a mass of critical learning. It is, in some respects, his most characteristic work. In 1914 he edited with the late Dr. A. G. Little an account of the works of Roger Bacon that bear on medicine. It was in the course of preparation of this publication that the author of this notice first entered Withington's circle. In 1927 Withington edited for the Loeb Library a volume of the "Surgical Treatises" of the Hippocratic Collection. There he stands out clearly as an authentic member of the great line of interpreters of medical antiquity which includes such names as Koraes, Littré, Francis Adams, and Petrequin. As a scholar he is their peer; as a writer he excels them all.

Withington's most serious undertaking and that by which, in a juster world, he should be longest and best remembered is his great work on Greek medical terms. On this he laboured selflessly and without thought of reward or recognition for nigh forty years. The winnowed results of all this patient toil have been incorporated in the new edition (1940) of the great Greek lexicon known by the name of Liddell and Scott. It is the simple truth that any work of Greek medical scholarship that may appear in the future must be influenced by this modest, self-effacing, single-minded student.

It may be that there are among the readers of this notice some who would refresh themselves with characteristic examples of the wisdom of this remarkable man. They may be recommended to the following: "John Locke as a Medical Practitioner" in *Janus*, 1909, p. 491; "Galen, Plato, and Immortality" in *Contributions to Medical and Biological Research dedicated to Sir William Osler*, 1919, vol. I, p. 200; "Philosophy of Galen" in the *Medical Magazine*, 1904, p. 8; "Vampires" in the *Medical Magazine*, 1896, p. 1196; "Medicine in Mediaeval Monasteries" in the *Medical Magazine*, 1896, p. 508; and "The Asclepiadae and the Priests of Asclepius" in volume II of Charles Singer's *Studies in the History and Method of Science*, 1920, p. 206. Lastly, "John Weyer and the Witch Mania" in volume I of the same work reveals that fierce hatred of cruelty and injustice that only a few of his friends knew lay behind those thoughtful gentle eyes.—C. S.

P. R. WRIGLEY, F.R.C.S.

Philip Roscoe Wrigley, honorary consulting surgeon to the Manchester Royal Infirmary, died at his home in Swettenham, near Congleton, on May 2. After winning the Sam Bradley Memorial Scholarship in clinical surgery as a student of Owen's College, he qualified in 1900. He was a house-surgeon at the Manchester Royal Infirmary, and for two years a resident at the Pendlebury Children's Hospital. Other resident appointments he held were at Salford and at Ancoats. In 1905 he took the F.R.C.S. and returned to the Royal Infirmary as its resident surgical officer. Two years later he started in consulting practice, and was soon appointed to the surgical staff of the Infirmary, continuing in active work there until he reached the age limit of 60. During this time he lectured on operative and pathological surgery at the University and was also honorary surgeon for children at the Manchester Northern Hospital. He was at one time president of the Manchester Surgical Society and vice-president of the Manchester Medical Society. In the first world war he went with other Manchester men in the 33rd General Hospital, organized by Mr. A. H. Burgess, to Mesopotamia. He held the rank of captain, R.A.M.C., and later finished his war service under Col. Westmacott at Wimereux in France.

Under average height, Philip Wrigley was an unassuming, self-possessed, and self-confident man doing good surgery in hospital and private practice without adding any special variations of technique of his own devising. He wrote several papers on his clinical experience of acute surgical conditions. He will be greatly missed by his former colleagues and by the many students with whom he had such friendly and cordial relations.

A colleague writes: The death, after only a few days of illness, of Philip Wrigley came as a severe blow to his Manchester colleagues. He was elected honorary assistant surgeon to the Manchester Royal Infirmary in 1910, honorary surgeon with charge of a surgical unit in 1921, and honorary consulting surgeon in 1942. For many years he was also consulting surgeon to the Buxton Cottage Hospital. He was a Fellow of the Association of Surgeons of Great Britain and Ireland, and he took a great interest in the local medical societies. Wrigley made several communications to surgical literature, chiefly in connexion with abdominal surgery. Small in stature, "Pip" Wrigley, as he was familiarly known to his colleagues, was a thoroughly efficient general surgeon, possessed of a very kindly, modest, and retiring disposition. He was extremely popular alike with his colleagues and his patients. Indeed, he inspired such complete confidence as to be chosen by so many of his colleagues to operate upon themselves when necessity arose that he became known as the "surgeons' surgeon."

T. N. V. POTTS, M.D.

Dr. Thomas Norman Vickers Potts died at Louth County Infirmary at the age of 50 on April 23, after two days' illness. He was a student at Durham University, and qualified M.B., B.S. in 1919. Shortly afterwards he proceeded M.D. and took the B.Hy. and D.P.H. After holding the usual resident

posts at his hospital, he was appointed medical officer of the City Infectious Diseases Hospital, Newcastle, where he remained for five years. He then became deputy medical officer of health for Birmingham. Then followed his appointment as county medical officer to the West Riding of Yorkshire in 1929, at the early age of 32. He held this office with great distinction and contributed much to the welfare of the county.

Dr. Potts was always an enthusiastic member of the British Medical Association, joining immediately after qualification in 1920, accepting office on the executive committee of the Wakefield Division from the commencement of his term of office as M.O.H. to the West Riding, and retaining his interest throughout. He was a most useful and business-like member, contributing fully to any matter under discussion. He was representative to the Representative Meeting in 1933 at Dublin and was chairman of the Wakefield, Pontefract, and Castleford Division, 1936 to 1938. He was a member of the Council of the Association from 1942 to 1944 and served on several central committees. At the 1938 annual meeting he was vice-president of the section of public health and hygiene. While in Yorkshire he acted as president of the Yorkshire Branch of the Society of Medical Officers of Health, and he was a Fellow of the Royal Sanitary Institute. He had a pleasant personality and was a reliable counsellor. He leaves a widow and one daughter.

R. L. writes: Dr. T. N. V. Potts was appointed at a very early age to one of the most envied posts in the public health service. The West Riding appointment, gained in competition against older men who were to be his subordinates, offered potential difficulties to the new C.M.O., but Dr. Potts by a certain self-effacement and a generous attribution of merited praise to his assistants gained their unwavering loyalty and co-operation. At the time of his appointment there were many changes impending in the rearrangement of county districts, the tranfer of poor law hospitals to the public health committee, and the formation of a salaried midwifery service. The latter was one of the first, if not the first, in the North of England to be formally approved by the Ministry of Health. The transfer of hospitals involved extensive changes, and in view of the reorganization necessary the county council sent a deputation of members and officials to certain newly built hospitals in Europe. Dr. Potts brought back from this tour valuable information, which was presented in a detailed report. The outbreak of war in 1939 stopped all plans for hospital grading and building and Dr. Potts turned his attention to the urgent needs of the ambulance and fire-fighting services and to the provision of emergency hospitals and maternity homes in relatively safe parts of the county. Towards the end of the war failing health caused him to send in his resignation. The extensive staff and, in particular, the health visitors regarded his resignation with dismay and learned of his death with unfeigned sorrow.

SIR ALMROTH WRIGHT

Dr. Leonard Colebrook writes: For those of us who were privileged to work with Wright there will always remain the memory of his extraordinary intellectual vigour and his immense capacity for work. We see him quietly preoccupied during all the years of his life with one problem after another—often toiling away at his laboratory bench long after everyone else had gone home, quite regardless of the meal that had been prepared for him hours before and of his own bodily weariness. He could not rest while any question was unresolved in his mind or an experiment unfinished. Quoting Emerson, he used to say, "God has given every man the choice between truth and repose." Wright had two chief aims: first, to bring more science into the practice of medicine, and, secondly, to bring clear thinking to bear upon the big fundamental questions which concern us all—man's relation to his fellows, the principles of morality (especially intellectual morality), the concept of immortality, etc.

For those of later generations who have not been familiar with his work it may be useful to have a list of the chief subjects to which he applied his fertile mind—and wrote about. Whatever place each of his many contributions may have in the developing body of knowledge it is safe to say that none is devoid of interesting, original ideas; most of them contain valuable experimental data; and all are presented in his characteristically lucid, if not always easy, style. The following list is far from complete. I have compiled it chiefly from memory, have given in some cases paraphrased titles, and sometimes have added brief comments (in brackets). Incomplete references are sometimes given; the rest can be found, for the most part, at the end of his book on "Technique," or I shall be happy to supply them. The order is roughly chronological:

1. "On the Physiological Element in Emotion." *Brain*, 1895.
2. "On Colour Shadows in Nature." *Nineteenth Century*, 1895. (This paper has opened a fascinating new world to many lay people.)
3. "On Citrating Cow's Milk for Infant Feeding." *Lancet*, 1893. (Wright always regarded this as one of his most useful contributions to medicine.)
4. *On the Principles of Microscopy*. Constable, 1906. (A book recording his experimental examination of the optical principles involved in the microscope.)
5. "On Anti-Typhoid Inoculation and the Measurement of the Bactericidal Power of Human Blood." (A series of five papers in the *Lancet* and the *British Medical Journal*," 1897–1901, which include the description of the first of his many micro-methods of blood examination. These papers make a landmark in the history of medicine.)
6. "On the Part played by Serum in Phagocytosis and on Measurement of the 'Opsonic Index.'" *Proc. roy Soc.*, 1903, 1904, and 1906.
7. "On the Vaccine Treatment of Tuberculous, Staphylococcal, Streptococcal and other Infections." (An important series of papers chiefly in the *Lancet* and *British Medical Journal*, 1904–1912, which develop Wright's conception of the physician as an immunizor.)
8. *On Prophylactic Inoculation of Rand Miners against Pneumonia*. Constable, 1914. (This book describes Wright's work in South Africa and deals also with the logical methods which ought to be employed in evaluating therapeutic agents).
9. "On Woman Suffrage." A letter to *The Times* of March 27, 1912, and a book entitled, *The Unexpurgated Case against Woman Suffrage*. Constable, 1913. (The letter to *The Times* is a remarkable statement in Wright's best prose of the anti-feminist position, which exerted a considerable influence at the time of the Adult Franchise Bill. The book is a further development of this theme.)
10. "On the Physiology and Treatment of War Wounds," including: (*a*) Studies on the factors which permit microbes to develop in such profusion in war wounds. (*b*) Studies on the bactericidal activity of leucocytes. (*c*) The treatment of wounds by hypertonic salt solution. (*d*) A polemic on the treatment of war wounds by antiseptics in reply to Sir Watson Cheyne. *Lancet*, 1916, **2**. (*e*) "On the Pathology and Treatment of Gas Gangrene." (This series of papers, in my view, comprise some of the best of Wright's medical work although much of it has never yet got into textbooks.)
11. *On the Technique of the Teat and Capillary Glass Tube*. Constable, 1912, revised in 1921. (A handbook of unique character "for the medical research laboratory and the research ward" embodying all the technical laboratory procedures developed by Wright and his co-workers up to the date of publication.)
12. "On 'Intertraction.'" *Proc. roy. Soc.*, Series A, 1921, **92**; and 1926, **112**. (These, and other papers, deal with what Wright regarded as a previously undescribed physical process governing the mixture of fluids of different densities, including some body fluids. Wright's interpretation of the phenomena observed was not accepted by some physicists, but he himself was never convinced that his interpretation was at fault.)
13. "On the Growth of the Tubercle Bacillus in Human Blood and the Employment of this Procedure for the Study of Tuberculosis and Chemotherapeutic Remedies." *Lancet*, 1924, **1**, 218.
14. "On the Immunization of Blood *in vitro*, and its Use for Immuno-transfusion." *Lancet*, 1923, **1**.
15. "On the Need to Abandon Much of the Immunological Doctrine Previously Regarded as Well Founded." *Proc. roy. Soc. Med.*, 1942, **35**, 161. (The doctrine abandoned includes much of Wright's own earlier teaching.)
16. "On Induction and the Conduct of Experiments dealing with Causation." (This philosophical essay is included in the series of Studies on Immunization published by Heinemann (Vol. 4) in 1943.)
17. *Prolegomena to the Logic which Searches for Truth*. (This book, published by Heinemann in 1941, is the prologue to a much larger book on philosophical questions which Wright was working on until the last month of his life and which is now almost ready for publication. At one time it took the form of a "Dictionary of Principles," but in recent years he attempted in it to formulate a system of logic more applicable to the problems of the modern world than are the older systems of formal logic.

The "prolegomena" gives a synopsis of the matters to be dealt with in the larger book, a glossary, and two or three preliminary chapters.)

Few men of any age can have left such a record of constructive intellectual effort, and few medical men can have exerted so great an influence upon contemporary thought. When Wright was a young man physicians were still chiefly concerned with the relief of symptoms, treatment was still largely empirical, the bottle of "mixture" which had come down to us from the past was predominant. Even Pasteur's brilliant results with immunization had been obtained, for the most part, by hit-and-miss methods. Wright taught us to look beneath the surface at the "sub-perceptible" changes in the body—to trace the effect of drugs, vaccines, etc., upon the constituents of the blood rather than upon the whole man—and to measure the response to treatment. To-day when we give penicillin or the sulphonamides we ask ourselves, as a matter of course, what concentration in the blood our dosage will maintain and whether the infecting microbe is sensitive to the drug, and we take trouble to ascertain these things. That changed attitude is due more, I think, to Wright's influence than to that of any other man.

Although much of his teaching has not been widely accepted—and the trend of medicine in the last few years has been towards chemo- rather than immuno-therapy—the future may yet prove that the broad path of progress is along the lines Wright's vision and his unsparing labour have indicated to us. Before we reject his teaching we should do well to recall that some of the antityphoid vaccine he prepared for soldiers going to South Africa 50 years ago was dumped overboard by those who thought "The Old Man" crazy.

Dr. WILLIAM BYRON MILBANKE died at his home in Sunderland on April 11 at the age of 79. He had been at work in his surgery up to the day before his death. A student of Durham University, Dr. Milbanke qualified in 1898 and had been in general practice for 48 years.

Dr. A. A. McIntosh Nicol writes: On the death of Dr. W. Milbanke the medical profession in Sunderland lost one of its oldest practitioners and the town one of its most respected citizens. He belonged to a past generation, and to the end he maintained that dignity of carriage and charming manner which so characterized him. Before the 1914–18 war he was a keen Territorial and was attached to the Durham Light Infantry, but on account of his age he was not allowed to proceed overseas with that regiment. He did so later, however, with the Royal Artillery, and served in France and was mentioned in dispatches. He joined the British Medical Association in 1900; was chairman of the Sunderland Division in 1926–7; represented his constituency at the Annual Representative Meeting in 1928; and took a very keen interest in the affairs of the Division to the end of his life. He was much sought after for advice, as his candour and fearlessness in debate were highly esteemed. He was not a man of many words, but when he did speak he spoke with sincerity and conviction. Dr. Milbanke had intended to retire in 1939, but decided to carry on in view of the fact that so many of the younger men would be leaving for the Services. During the war he was medical officer at a first-aid post and was unfailing in his duty, attending at his post regularly in the midst of all the blitzes in this badly scarred northern town. To the end he was active and mentally alert, and on the day before his death was seeing patients as usual. He died the death he would have wished, in harness to the end. We are all the poorer for his passing.

Dr. JAMES KENNEDY MANSON died suddenly on April 13 at the comparatively early age of 57 years. Graduating from Glasgow University in 1914, Manson had a varied and interesting career. He saw much service as a captain, R.A.M.C., during the 1914–18 war. While in East Africa he became greatly interested in tropical medicine and, in collaboration with L. D. H. Thornton, prepared a report on relapsing fever which was later published in the *Journal of the R.A.M.C.* After demobilization he was in general practice in this country until, in 1923, he proceeded to India to join the medical service of the then South Indian Railway Company. He retired from that service in 1935 to take up general practice again in Peebles, Scotland. In 1940 he was posted back to the South Indian Railway as its chief medical officer. With the rank of major he served continuously until the end of 1945. During this period he was admitted as a Serving Brother of the Order of St. John of Jerusalem. His health had been impaired during those latter strenuous years, but in August, 1946, he was appointed a deputy commissioner of medical services with the Ministry of Pensions at their headquarters at Norcross, Lancs., which appointment he held at the time of his death. Of a kindly and unobtrusive disposition, James Kennedy Manson never spared himself in the interests of his profession. Music and literature were his hobbies. His memory will long be cherished by his many friends and former patients.—J. M.

Dr. JOHN DEWAR ROBSON died at his home in Dumfries, at the age of 79, on April 26. He qualified M.B., C.M. at Edinburgh in 1890, and soon afterwards acted as assistant to a practice in Wensleydale, where he did his round on horseback. Fifty years ago he settled in Dumfries and became honorary radiologist to the Dumfries and Galloway Royal Infirmary. He had to resign this post because his hands were affected by the *x* rays; later the malignant areas were excised. He had been an active member of the British Medical Association for over fifty years and was chairman of the local Division in 1928–9. He was interested in shooting, fishing, football, billiards, skating, and bowling, at which last he was Scottish champion in 1907. He suffered fools badly, but was always ready to help youth and the poor. He was the doyen of the medical profession in Dumfries and he remained "in harness" to within two months of the end. He was married twice, and his second wife, a son, and a daughter survive him.

DR. S. A. MONCKTON COPEMAN, F.R.S.

A memorial service for Dr. S. A. Monckton Copeman, F.R.S., was held on May 7 at the Church of the Order of St. John of Jerusalem. Major-General R. J. Blackham gave the address, and among those present were: Sir Weldon Dalrymple-Champneys, representing the Ministry of Health; Sir George Elliston, M.P., the Society of Medical Officers of Health; Major-General J. E. T. Younger, the Order of St. John of Jerusalem; Dr. Andrew Shinnie, the Westminster City Council; Dr. A. L. Crockford, representing St. Thomas's Hospital; Dr. A. E. Hindle, the Zoological Society; Mr. A. E. Roche, the Hunterian Society; Mr. W. C. Hornby Steer, the Hampstead Borough Council; Sir Allen Daley, the L.C.C.; Mr. H. H. Gerrans, the Royal Institute of Public Health; Mr. A. E. Porritt, the Provincial Grand Lodge.

Medico-Legal

FAILURE OF A RESTRICTIVE COVENANT

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

A covenant in restraint of subsequent practice in the neighbourhood is a necessary part of every agreement between doctors to associate in practice. A retiring partner, the seller of a practice, or an ex-assistant, having gained an intimate knowledge of the practice, would obviously be very dangerous competitors if they remained in the neighbourhood. Such covenants, however, need to be carefully drawn, for if the court considers that a covenant is unreasonable in one respect which is not severable from the rest, the whole becomes invalid and the outgoing practitioner is not restrained from competition. The reports contain few cases which could guide draftsmen, who consequently have had to devise forms which would correspond as nearly as possible with the spirit of the available decisions. The judgment of Mr. Justice Evershed in *Routh v. Jones* (1947, 1 All E.R. 179), which was confirmed by the Court of Appeal on April 18, has caused widespread interest by invalidating the form of restrictive covenant which has been commonly used by the British Medical Bureau in agreement between doctors, and is embodied in a very considerable number of existing contracts.

Two partners in a general practice in Okehampton, Devon, engaged an assistant in March, 1943. At the end of December he signed a covenant binding himself not to practise or cause or assist any other person to practise in any department of medicine, surgery, or midwifery, nor accept or fulfil any professional appointment, whether paid or whether honorary, within a radius of ten miles from the partnership address for five years after his assistantship ended. In March, 1946, he left the service of the partners and bought a house in Okehampton, intending to set up in practice. The partners moved the

court for an interlocutory injunction to restrain him from breach of the covenant, and when the motion was heard the parties agreed that it should be treated as the trial of the action.

Competition by a Former Servant

The learned judge said that the original concept of law that all contracts in restraint of trade were obnoxious had been profoundly modified in the last hundred years. Now, although a master cannot ordinarily bind a servant to refrain from competing with him later, yet if the servant has been put in a position to learn trade secrets, or to acquire a special or intimate knowledge of the affairs of his master's customers, clients, or patients, or to acquire means of influence over them, there exists a proprietary interest or goodwill which is entitled to protection. The competition of the former servant would be unfair, for it would grow not so much from his personal skill as from his intimate knowledge of his master's business. A medical assistant necessarily comes into this category. The judge then dealt with the principles on which the various provisions in a covenant may be severed from one another. This may only happen, he said, when there are really two or more separate covenants. The benefit of any doubt goes against the party who wants to sever the clauses, and the interest of the public must be considered as well as that of the parties. The present covenant, his Lordship said, was severable into two parts; the one dealing with private practice and the other dealing with the acceptance of professional appointments. He held that the second part was too wide to be enforceable. It would cover such an appointment as honorary lecturer to the St. John Ambulance, and any medical appointment under a local authority; it could not be justified as reasonable or necessary for the protection of any proprietary interest of the partners. As this part was severable, its failure did not vitiate the first part, but this also his Lordship found unreasonably wide. He thought that the word "assist" could not exclude financial assistance, so that the ex-assistant would, for example, be prohibited from advancing money to a lady to enable her to establish a maternity home within the area. Such a restriction could not be justified, and so unless the restriction on causing or assisting another to practise could be severed from the restriction on personal practice, the whole of the first part must fall. He did not think this severance could be made, nor that the covenant intended to draw a distinction between practising as a principal on the one hand and exercising the profession vicariously or as another's servant on the other.

Even if such severance had been permissible, he gravely doubted whether the covenant could be supported. He would not be prepared to hold that a ten-mile radius was excessive, nor even the time-limit of five years. The difficulty arose from the words "any department of medicine, surgery, or midwifery." This formula would cover specialized branches of surgery such as ophthalmic, orthopaedic, plastic, and even dental and veterinary surgery. In the field of medicine such specialties as radiotherapy and radiology would also be barred. True, if a proprietary interest entitled to protection exists, the terms of the covenant need not necessarily be referable strictly to that interest. Proper and reasonable protection may well justify a general restriction against competition; but it must be competition with the business which is in fact conducted by the employers. It was true that if any of the restrictions of this covenant were unenforceable, the selling value of the practice would be diminished in proportion, but that result was not sufficient justification for the restriction.

His Lordship expressed some regret at his conclusion, for he took the view that a man ought to honour his part of a bargain which he expects the other party to observe, and it is no part of the duty of the court to relieve a man of bad bargains because they are bad. His regret, however, was tempered by two considerations. First, a servant is necessarily at a disadvantage in such contracts, and there is an obligation on masters to see that restrictive covenants are framed with precision and care and do not attempt undue exaction. Secondly, the ex-assistant had stated that he was ready and willing to undertake for eighteen months not to accept as a patient any person who was a patient of the practice at the time when his assistantship ended. His Lordship therefore dismissed the motion with costs, with this undertaking as part of the order.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The following medical degrees were conferred on April 26:

M.CHIR.—*In person*: W. W. Wiggins-Davies.

M.B., B.CHIR.—*By proxy*: R. D. Bastham, D. N. Lawson, J. G. Mathewson, J. H. H. Glyn, J. M. Childs, E. Pringle, S. K. K. Sze, R. Hodgkinson.

UNIVERSITY OF MANCHESTER

The following candidates have been approved at the examinations indicated:

THIRD M.B., CH.B.—*Pharmacology, Pathology, and Bacteriology*: H. de C. Baker, V. Broadhurst, Nancy M. Cosslett, J. L. Cotton, H. G Fleetwood, Muriel M. Hughes, Freda W. Lunt, C. A. Mays, K. D. Pinson, Maria R. Reif, G. A. Steele, D. B. S. Taylor, H. L. Wolfe. *Pharmacology*: Mary P. Armstrong, I. A. Susman, R. V. Sykes. *Pathology and Bacteriology*: Helen B. Mair.

UNIVERSITY OF LIVERPOOL

The following candidates have been approved at the examination indicated:

D.T.M. AND H.—D. Adler, D. A. Andersen (recommended for Warrington Yorke Medal), T. W. Buckley, J. Cameron, J. C. Chartres, J. M. Clow (recommended for Milne Medal), J. J. Elphinstone, W. M. Holley, Y. Ip, B. M. Kothary, D. T. H. Ling, R. A. McInroy, K. B. Mistry, N. M. Mohammed, A. J. Nicholas, G. Q. Patton, Gladys Rutherford, G. T. Stewart, S. S. Y. To, R. H. Townshend

UNIVERSITY OF BIRMINGHAM

The University has appointed Drs. W. L. Lloyd and N. G. Marr as Lecturers in Occupational Health in the Department of Social Medicine. The future activities of the University in this field will include undergraduate and postgraduate teaching in occupational health, as well as a research programme centred on the industries of the Midland area.

UNIVERSITY OF DUBLIN

The Montgomery Lecture on Ophthalmology will be delivered by Emeritus Professor Bernard R. Samuels, M.D. (Cornell University) in the Dixon Hall, Trinity College, on Thursday, May 22, at 5 p.m. His subject is "The Problem of Sympathetic Ophthalmia." The lecture is open to the public.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

Election of Fellows

At a quarterly Comitia of the Royal College of Physicians of London, held on April 24, with the President, Lord Moran, in the chair, the following were elected Fellows:

Surg. Vice-Admiral H. St. C. Colson, M.B., R.N. (London); G. B. Fleming, M.D. (Glasgow); William Gilliatt, M.D., F.R.C.S., P.R.C.O.G. (London); Geoffrey Jefferson, M.B., F.R.S., F.R.C.S. (Manchester); W. A. Bourne, M.D. (Hove); C. S. D. Don, M.D. (Manchester); H. V. Dicks, M.D. (Leeds); J. M. Twhigg, M.D., F.R.A.C.P. (Wellington, New Zealand); Una C. Ledingham, M.D. (London); A. A. McI. Nicol, M.D. (Sunderland); W. E. Chiesman, M.D. (Edinbridge); L. W. Hale, M.D. (Camborne); W. H. Brown, D.M. (Toronto); H. P. Brody, M.R.C.P. (Sheffield); G. A. Ransome, M.R.C.P. (Singapore); M. I. A. Hunter, M.D. (Malaya); G. E. Godber, D.M. (Epsom); N. C. Oswald, M.B. (London); K. M. Robertson, M.D. (Winchester); R. H. Dobbs, M.D. (London); J. W. Litchfield, B.M. (London); L. C. Martin, M.D. (Cambridge); G. D. Hadley, M.D. (London); W. N. Mann, M.D. (London); C. Hardwick, M.D. (London); R. S. Illingworth, M.D. (Sheffield); Isabel G. H. Wilson, M.D. (London); J. H. Hutchison, M.D. (Glasgow); S. R. F. Whittaker, M.D. (Leamington); J. F. Stokes, M.B. (Watford); C. M. Fletcher, M.D. (Penarth); H. L. Sheehan, M.D. (Liverpool); H. S. Banks, M.D. (London); R. Marshall, M.D. (Belfast).

The President announced that he had appointed Dr. R. A. Young to represent the College at the Health and Tuberculosis Conference on July 8, 9, and 10.

Reports were received from the Committee on Cardiology and from the Rheumatic Fever Committee.

Membership

The following candidates, having satisfied the Censors' Board, were elected Members:

G. Ansell, M.B., W. M. Arnott, M.D., D. C. Beatty, M.B., J. R. Bignall, M.B., J. J. Billings, M.D., J. Black, M.D., D. C. Brown, M.B., E. D. Burnard, M.B., J. N. M. Chalmers, M.D., C. F. Cooper, M.B., J. G. K. Dean, M.B., J. P. Donaghy, M.B., S. E. Finlay, M.B., J. Foley, M.B., H. A. W. Forbes, B.M., D. M. I. Freeman, M.B., J. S. Frew, M.B., S. C. Gold, M.B., J. L. Greaves, M.B., M. H. K. Haggie, M.B., B. J. Hilton, M.B., J. C. W. Hopkyns, B.M., L. H. Horwitz, M.B., R. T. Jenkins, M.B., H. B. Kay, M.D., A. C. Kirby, M.B., J. M. S. Knott, M.B., D. Landsborough, M.D., J. R. Lauckner, M.B., R. R. H. Lovell, M.B., B. S. Lush, M.B., I. P. McL. MacDougall, M.B., R. I. Mackay, M.B., R. L. MacMillan, M.D., P. R. A. May, M.B., J. H. D. Millar, M.D., M. D. Milne, M.B., E. S. Monteiro, L.M.S., A. J. Moon, M.B., B. B. Mukheji, M.B., T. Partington, M.B., T. M. Ll. Price, M.B., R. A.

Pyper, M.D., C. E. Quin, M.B., G. Read, M.B., W. McI. Rose, M.D., G. M. S. Ryan, M.B., T. Semple, M.D., A. G. Spencer, M.B., J. S. Stead, M.B., C. J. Stevenson, M.B., P. Stradling, M.B., C. Strang, M.B., C. V. Talwakar, M.D., Vivian M. N. Usborne, M.B., R. H. Vasey, M.D., E. G. Wade, M.B., O. H. Warwick, M.D., S. D. V. Weller, M.B., F. A. Whitlock, M.B., J. T. Wright, B.M.

Licences

Licences to practise were conferred upon the following 136 candidates (including 26 women) who had passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board, and who have complied with the necessary by-laws:

Elizabeth J. Acton Davis, Unity R. Allen, Patricia M. Appleton, J. H. Apted, A. G. Atkinson, A. Bagon, A. Bell, Elizabeth A. Bevan John, J. L. Bleakley, H. J. G. Bloom, J. F. Bolton Carter, P. H. Brasher, Jean F. C. Brown, J. H. S Buchanan, N. G. P. Butler, Pamela H. Canham, M. T. F. Carpendale, D. L. Chadwick, K. B. Chambers, D. J. Chapman, A. Chopra, Jill C. Clark, J. G. W. Clarke, M. H. F. Coigley, P. D. Collingwood, M. B. Conran, H. G. W. Cooke, J. B. Cowie, J. T. Crean, E. G. W. Cross, M. E. S. Cutts, O. W. Davies, K. R. H. Deane, J. E. R. Dixon, N. H. Dray, J. B. Eades, R. L. Edwards, Angela I. Emerson, E. Evans, L. J. Evered, Sheila Fairclough, Margaret L. Fallon, K. M. Fergusson, J. J. Fingard, H. Forman, R. M. Forrester, A. L. Forster, M. J. Forth, H.-J. B. Galbraith, D. J. Gardner, B. A. Gavourin, Wilhelmina N. Gaye, T. W. A. Glenister, N. G. O. Gourlay, J. C. Graves, J. M. Hall, D. A. Hanson, J. G. Harrison, R. A. Harrison, H. H. Hayes, Daphne M. Haynes, D. G. H. Hollis, Mary C. Holt, J. Hope, P. J. Horsey, Frances S. Huxley, R. N. Jackson, H. Jarvis, E. Jones, R. K. Jones, H. B. Juby, H. M. Kershaw, R. C. King, C. D. Korn, J. B. Lyn-Jones, A. M. McCall, J. M. S. McCoy, Janet L. McKenzie, Jocelyn P. Mandelstan, C. A. Martin, J. Q. Matthias, B. W. Meade, P. H. Merory, I. F. Michie, Rhiannon Morris, J. P. Mostyn, R. J. Moylan-Jones, Josephine C. Mulcahy, D. H. Musselwhite, J. Nagington, H. J. V. M. Ormerod, A. Paton, F. A. Pearson, M. H. Pettigrew, T. A. J. Prankerd, R. M. McK. Pratt, J. S. Prior, R. R. L. Pryer, Sonia A. Purdie, Mary M. Rayner, P. Read, R. T. Rennie, A. Rezler, H. Rezler, D. H. Richards, A. H. Rinsler, J. M. D. Roberts, E. Roderic-Evans, C. J. Roux, G. C. Ryan, A. H. Sader, E. K. Scott, Mari R. Simpson, S. Slovick, Esther Smith, G. D. R. Smith, C. J. Snell, J. Stephenson, Winifred A. Sterndale-Bennett, H. Stewart, A. R. Swanton, C. Taylor, J. T. L. Unsworth, H. Urich, Helen B. Walker, N. A. Walker, J. R. Watson, Mary B. Watson, J. L. C. Whitcombe, H. M. White, Rose A. J. Whitelaw, E. Williams, K. M. Williams, T. A. Williamson, N. E. Winstone, J. R. R. Wray.

Diplomas

Diplomas in Ophthalmic Medicine and Surgery and in Physical Medicine were granted, jointly with the Royal College of Surgeons of England, to the successful candidates whose names were printed in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of March 29 (p. 434).

Diplomas in Child Health were granted, jointly with the Royal College of Surgeons of England, to V. D. Arora and to the successful candidates whose names were printed in the report of the meeting of the Royal College of Surgeons of England in the *Journal* of May 3 (p. 619); as were the names of the recipients of the Diploma in Tropical Medicine and Hygiene.

A Diploma in Laryngology and Otology was granted, jointly with the Royal College of Surgeons of England, to R. T. Raymond-Jones.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The following lectures in ophthalmology will be delivered at the College (Lincoln's Inn Fields, W.C.): June 2, 5 p.m., Mr. J. W. Tudor Thomas, Corneal Transplantation; June 3, 5 p.m., Mrs. A. Pirie, Experimental Aspects of Nutrition and Eye Disease; June 6, 5 p.m., Mr. H. Ridley, Nutrition and Eye Disease; June 9, 5 p.m., Mr. T. Keith Lyle, Squint Surgery; June 10, 5 p.m., Dr. Alice Carleton, Skin Disease in Relation to Ophthalmology; June 11, 5 p.m., Mr. F. A. Williamson-Noble, Glaucoma Surgery; June 13, 5 p.m., Prof. W. J. B. Riddell, Hereditary Eye Disease; June 16, 5 p.m., Mr. Brodie Hughes, Interpretation of Visual Field Defects; June 17 and 18, 5 p.m., Mr. Geoffrey Knight, Neuro-surgery in Relation to Ophthalmology; June 20, 3 p.m., Dr. W. R. Brain, Exophthalmos Apart from Endocrine Disease; 4.30 p.m., Dr. Brain, Exophthalmos of Endocrine Origin. The fee for the whole course is £5 5s. Fellows and Members of the College and Licentiates in Dental Surgery will be admitted for £3 3s. Applications, accompanied by a cheque for £5 5s. or £3 3s., should be sent to the assistant secretary, Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

The following candidates have satisfied the examiners at the examination indicated:

DIPLOMA IN OBSTETRICS.—J. R. Ballantyne, A. C. Barthels, D. C. A. Bevis, G. R. Bourne, Kathleen A. C. Bowen, J. A. Bowen-Jones, L. Boyars, Elizabeth C. M. Brunvate, Joyce B. Burke, H. C. Burnell, J. P. Bush, W. E. Chapman, F. J. Cockersole, D. P. Cocks, E. Cope, G. H. R. Curnock, Alice Davies, Margaret E. Davies, J. E. Drabble, Patricia M. Elliott, Geraldine W. Everett, S. C. J. Falkman, M. R. Fell, H. J. Fisher, B. J. Frankenberg, Jean M. Frazer, G. B. Gibson, L. S. Glass, C. J. Griffin, G. N. Grose, Elizabeth M. Harper, D. Hay, J. A. Henderson, G. S. Hopkins, Jean A. Horne, B. G. Isaacs, A. G. Jones, G. D. Kelly, Janet F. Kennedy, N. A. King, D. V. Latham, C. Lewthwaite, G. I. Louisson, C. Mackie, A. T. McNeil, Betty E. A. Magill, D. Mander, Edith M. Metcalfe, R. T. Michael, C. E. Miller, A. Milton, Doreen Mitchell, Annapurna Mukherji, M. R. Neely, G. F. Newbold, D. Nixon, Helen M. Noble, Margaret B. Noble, Barbara D. Oakley, A. D. Parsons, S. D. Perchard, F. C. R. Picton, E. D. Pond, K. I. Price, S. W. Price, Margaret Randell, E. N. Rees, Rachel Richards, L. F. Richards, J. G. Rountree, W. S. Russell, Ruth Sabel, T. J. Scannell, Charlotte Sommer-Hirsch, Kathleen H. Stewart, B. S. Surti, C. W. Sweetnam, Sheila R. Tangye, Mary E. Tighe, St. J. M. A. Tolhurst, E. F. Twiss, M. J. Twomey, W. A. Walker, Winifred I. Watson, Constance M. Watt, C. T. H. Whiteside, Roberta Williams, J. K. Wilson, S. H. Wong, Elizabeth Younger.

Medical Notes in Parliament

Food Situation

Lord WOOLTON, in the House of Lords on May 7, called attention to the growing danger of a serious shortage of food in this country. He said the housewife was weary and alarmed and he doubted whether the heavy workers of the country were getting enough of the right sort of food, and particularly of fats, to enable them to give increased production. The previous day he had read in the medical Press a special article by a Dr. Frank Bicknell which began, "England is dying of starvation." In the Coalition Government the one foundation of the nation's food supplies had been the securing of an adequate amount of fats. Experience convinced him that this job of providing adequate food for the people of the country was not being done. The meat position was very serious. The scheme of bread rationing had broken down and the system of coupons did not work. That was what the bakers told him. The country would continue to have a fuel shortage, but if it also had a food shortage the Government would deserve the censure of the people. The time had come to make an end of this low standard of living.

Lord HENDERSON, replying for the Government, said fresh calamities might be in store as unforeseen as the blizzards and floods of last winter, but the prospects of a fair harvest in the United Kingdom were better than anyone a month ago thought possible. The country could count on a good supply of wheat from Argentina's new crop, and the United States promised to send a large quantity during the three months July–September. The Government expected to provide a balanced and increasing ration for an expanding livestock population. So far as bacon, eggs, butter, margarine, cooking fats, milk, and cheese were concerned there was every reason to expect that the supply would continue during the remainder of this year at least as good as it was now. Although oils and fats were still subject to world shortage the Government expected to maintain the fats and soap rations through 1947 at their present level. The supply and consumption of milk continued to mount and the sale of liquid milk to the public steadily increased. The supply of eggs this year should be maintained at its present level and an increasing proportion of it consisted of eggs in shells. With sugar the country would do at least as well this year as last. Meat was the foodstuff of which the supply was most difficult. The Government was buying every ton of imported meat which it could afford, but it was by no means certain to make good the deficiency in home output and the rations might have to be reduced to the level ruling in May, 1946. The Government looked forward to a large increase in supplies of fish, and the quantities of potatoes available for consumption before the end of the season were likely to be adequate. By mid-June there should again be a reasonably plentiful supply of vegetables. The lateness of the spring increased the chances of a good fruit crop and imports of fruit were likely to exceed those of last year by not far short of 50%. The Government, to the utmost of its powers, would see that the food supplies of the people were maintained, and where possible raised.

Lord BEVERIDGE said the Government was too apt to be content with rationing. They ought not to aim at rationing indefinitely. Rationing was unjust to the individual and checked production.

Lord HARLECH said the bread ration in Britain was much better than in most European countries, and Britain was better off than most countries for potatoes, but worse off for vegetables. The meat supplies of this country were quite inadequate for the heavy workers. It was essential that the protein constituent of the ration should go up.

Lord RUSHOLME said there could be no foundation for a statement that food supplies available to the British people were down to the level of those of the German people. So far as meat, jam, cheese, sugar, and eggs were concerned, consumption per head at present was larger than in 1945, and so far as jam, cheese, and milk were concerned consumption was larger per head than in pre-war days. There was a world-wide shortage of fats and all importing countries were suffering.

Agricultural Difficulties

The debate was resumed on May 8 by Earl DE LA WARR. He said the losses of winter corn on the Continent were a great deal more serious than in Britain.

The Earl of HUNTINGDON said that in the last few months the British agricultural industry had suffered a major disaster which would affect the diet of the people. There was a serious reduction in the acreage of wheat; the acreage in sugar beet

was likely to fall; 75,000 tons of last year's crops and potatoes had been destroyed and some reduction must be expected in this year's supplies of potatoes. Until July many vegetables were likely to be in very short supply.

Lord LAMBERT said that in Devonshire the agricultural workers were all underfed and the manual worker was also underfed. They had colds and chills because they had not a sufficient diet.

Lord LLEWELLIN said that when people asserted the nation was getting more nutritional value in the form of milk the House must look at the fact that there were not many more cows, and that the nation was not getting the butter and cheese. Things had got worse since a consumption-level inquiry had been held in 1943. It would be better to take the really bad meat off the ration. He was delighted to see that fish was now coming in, but fish was of no avail without fats in which to fry it. Bacon unfortunately was also down.

Lord ADDISON agreed with Lord Woolton that the housewife was weary and tired. Nobody would rejoice more than the Government if the diet could be made more interesting and varied, but the fact was that the world was short of food. The assertion which Lord Woolton had quoted from Dr. Bicknell that England was dying of starvation was a monstrous falsehood. How did Dr. Bicknell know how the unemployed were fed before the war? The figures of Sir John Boyd Orr and Mr. Rowntree, and those which Lord Beveridge used in drawing up his own scheme, showed that before the war 77% of the population were so poor that they could not buy enough food. That was not the case to-day. Dr. Bicknell had said that the average person in Britain got 2,100 calories a day. The figure had been checked at the Ministry of Food and it actually was 2,900 calories. Dr. Bicknell said that the unrationed food, including potatoes, gave only 400 calories. Lord Addison understood that they probably gave a good deal more.

Lord WOOLTON said Lord Addison had found it necessary to use violent language about a statement made by a distinguished member of a profession to which Lord Addison used to belong. If that statement was wrong then the Government had ample means of correcting it. He himself wondered whether he had not minimized the danger of food shortages during the next three months. He begged the Government to take all the steps in its power so that the people did not have to suffer hunger during the coming months.

The debate concluded.

National Service and Doctors

During the all-night sitting on the National Service Bill on May 7, Clause 9 was ordered to stand part of the Bill.

Col. STODDART-SCOTT said that since the number of doctors who qualified each year had been just over 3,000, there would be far more doctors than were required for the Services. There would be 1,500 doctors fit to serve, and a force of 1,500,000 would be required to occupy them. The thing to be avoided was having Service doctors unemployed or partially employed while there were overworked doctors in general practice. There would also be in the Services more specialists than were required.

Mr. ISAACS said the Government did not wish to denude the country of doctors by taking them into the Forces. The Medical Priority Committee would be consulted on the best use of the available medical services. It might be best in some areas for the doctors to serve a shorter period or to be exempt. It might be best to say, "There are 1,000 doctors, but we want only 500." The Government would do the same with the specialists. It did not want to take a man into the Forces because he was a specialist. It would want to take the kind of specialist for which the Forces were looking.

Fowl Pest.—Up to May 2 the number of outbreaks of fowl pest confirmed by the Ministry of Agriculture was 147. In addition 160 suspected cases had on investigation proved to be negative. About 16,000 birds had been slaughtered at an approximate cost in compensation of £12,000. Since the most likely source of infection was uncooked poultry waste, Mr. Tom Williams has made it obligatory for all poultry keepers to boil such materials before allowing their birds to have access to them. The importation of live birds and hatching eggs from countries in which fowl pest is prevalent is not being permitted. Officers of his Department and of the Ministry of Food are examining the possibilities of minimizing the risk arising through the importation of dead poultry.

Medical Students.—Asked on May 8 what additional facilities were being provided for training medical students in view of the shortage of women doctors, Mr. BEVAN replied that all provincial medical schools admitted women students up to between 20% and 30% of the annual intake. The London schools had all now agreed to take a proportion of women as soon as accommodation could be provided. This should be ready for the 1947–8 session.

Condemned Prisoners.—Asked on May 8 by whom application had been made for an examination of the mental condition of Thomas John Ley, Mr. EDE said the consideration of the question whether a medical inquiry should be held into the mental condition of a prisoner under sentencce of death did not depend on the receipt of an application. It was his duty in every capital case to consider whether any question arose as to the prisoner's state of mind and to order a medical examination when he had reason to think further inquiry desirable.

Mr. LANG pointed out that the defence of insanity had not been raised at the trial, nor in the Court of Appeal. He asked Mr. Ede to assure the House that "this was not a trial by doctors to supersede a trial by jury." Mr. EDE said he was not bound by what had been submitted to the Courts. If he had any doubt of the mental stability of a person sentenced to death, his duty was to order a medical inquiry. If that inquiry took a certain course the matter was then completely out of the hands of the Home Secretary.

Sick Soldiers.—The current instruction regarding men wishing to report sick is that "soldiers . . . will not parade for this purpose but will inform the orderly N.C.O. and proceed independently to the M.I. room at a specified hour." Arrangements for transport are made if the M.I. room is at some distance from the unit lines.

Medical News

The jubilee dinner of the Chelsea Clinical Society will be held at South Kensington Hotel, Queensgate Terrace, S.W., on Tuesday, May 20, at 7.30 p.m. for 8 p.m.

A discussion on the training of contact lens practitioners, which was opened by Mr. Williamson-Noble, F.R.C.S., was held on April 21 at a meeting of the Contact Lens Society. Prof. Ida Mann presided.

A general meeting of the Middlesex County Medical Society will be held at Harefield County Hospital on Friday, May 23, at 3 p.m., when there will be demonstrations of cardiospasm; pneumonectomy for pulmonary tuberculosis; and massive doses of penicillin in the treatment of suppurative pneumonitis. At 4.15 p.m. three short papers on "Blood Changes in Tuberculous Meningitis," by Dr. L. E. Houghton, "Some Observations on Bronchial Carcinoma," by Dr. J. C. Roberts, and "Protein and Tuberculosis," by Dr. E. Nassau, will be read.

The Manchester and District Medical Golfers Association will hold its annual competition at Hale Barns, Cheshire, on June 4. Particulars may be obtained from the Hon. Secretaries, Manchester and District Medical Golfers Association, c/o British Medical Bureau, 33, Cross Street, Manchester, 2.

The annual meeting of the members of the Royal Medical Benevolent Fund will be held at the Medical Society of London, 11, Chandos Street, Cavendish Square, London, W., on Thursday, June 5, at 4 p.m., when the financial statement for the year ended Dec. 31, 1946, will be presented and the officers, committee, and honorary auditors elected for the current year.

A congress will be held in Prague from June 11 to 15 to celebrate the fiftieth anniversary of the Czechoslovak Stomatological Society. On June 11 and 13 the tenth annual congress of the A.R.P.A. Internationale will also be held in Prague. The official languages of the Czechoslovak Stomatologic Congress will be Czech and Slovak; lectures announced in advance may be spoken in English or French. Those wishing to attend should apply to Spolek ceskych zubních lékaru, Praha-II, Sokolská 31, Lékarsky dum.

Mr. Bernard W. Williams has been appointed Medical Adviser and Dean of the Medical School of the University of the West Indies from Jan. 1, 1947. Mr. Williams was born in Jamaica in 1895 and was educated at Exeter College, Oxford, and St. Thomas's Hospital. He won the Radcliffe Prize for Medical Research in 1926 and was Hunterian Professor in 1927. He was examiner in pathology to the R.C.S. and in surgery to Oxford University, and Sub-Dean of the Medical School at St. Thomas's.

The Chinese Medical Journal, founded in 1909 and suspended during the war, reappeared on May 1 with a monthly issue of 5,000 copies. Printed in Chinese, it is published in Shanghai.

The following members of the medical profession were recently elected Fellows of the Royal Society of Edinburgh: Hamilton Bailey, F.R.C.S., George Howard Bell, M.D., Group Capt. Gerald Struan Marshall, O.B.E., R.A.F.(ret.), and George Ranken Tudhope, M.D.

Dr. John Dale, Chief Health Officer to the Melbourne City Council, has been granted six months' leave of absence to study public health administration in Britain.

At the Socialist Medical Association's annual general meeting on May 11 a resolution was carried advocating the setting up of permanent day nurseries and nursery schools. Dr. Somerville Hastings, referring in his presidential address to the N.H.S. Act, said that the Minister of Health's views were sound, but that he was less happy about some of his advisers. The Association considered that large buildings in all areas should be adapted as temporary health centres and that the building of new centres in selected areas should be started immediately.

Dr. A. P. Cawadias, O.B.E., has been awarded the rank of Knight Commander of the Royal Hellenic Order of the Phœnix by the King of the Hellenes.

EPIDEMIOLOGICAL NOTES

Smallpox

In the original reports of the outbreak at Bilston, Staffs., it was suggested that the disease, imported from India, was variola minor (April 19, p. 549). This has proved to be incorrect, and most of the cases have been variola major of moderate severity. An unvaccinated labourer, not included in the list of contacts, died in hospital on May 2. The onset in this case was on April 25 and the rash appeared on April 29 (May 10, p. 664). Now his wife, vaccinated in infancy 64 years ago, and his son-in-law aged 30 and unvaccinated, have developed the disease while under surveillance. Both were vaccinated on May 2 after their recent exposure to infection.

In Coseley U.D., which is near Bilston, a woman aged 78, in poor health and confined to her house with bronchitis for several weeks, developed high fever about May 1 and pneumonia was diagnosed. A rash, first noticed on May 7, was thought to be associated with chemotherapy, but by May 9 had become semiconfluent. On this day the patient, now very ill, was removed to a smallpox hospital. It is reported that the original case in the Bilston series had visited this patient's residence "about a month ago." Details are not yet available, but this information may lead to a satisfactory explanation of the occurrence at Bilston of cases apparently outside the direct line of contact.

A case of smallpox in Sheffield cannot at present be associated with a known source. An unvaccinated schoolboy, aged 11 and living in a tenement house, sickened on May 1 and developed a rash on May 4. The diagnosis of smallpox was confirmed and the patient removed on May 10. Fortunately he had been confined to his bed since the onset.

Discussion of Table

In *England and Wales* infectious diseases were less prevalent and decreases were recorded in the notifications of measles 1,073, acute pneumonia 81, whooping-cough 73, scarlet fever 38, and cerebrospinal fever 17. An increase of 15 in the cases of dysentery provided the only exception to the downward trend.

A fall was recorded in the incidence of measles throughout the country, and the largest declines were Lancashire 243, Staffordshire 240, and Gloucestershire 104. A small fall in the notifications of whooping-cough was general and the only exception was an increase of 59 in Essex. The only changes of any size in the local returns of scarlet fever were a decrease in Middlesex 30 and a rise in Glamorganshire 23.

The decrease of 7 in the notifications of diphtheria reduced the total to one below the record low level of twelve weeks ago. The only significant change in the local incidence of dysentery was a rise of 12 in Lancashire. In the outbreak in Surrey 15 more cases of dysentery were recorded, bringing the total for the past three weeks to 53.

In *Scotland* decreases in the notifications were reported for whooping-cough 77, measles 61, and acute primary pneumonia 21. There were small rises in the incidence of scarlet fever 24 and cerebrospinal fever 12. The increase in cases of scarlet fever occurred in the western area, while the increase in cerebrospinal fever was contributed by the eastern area.

In *Eire* a fall was recorded in the incidence of most infectious diseases—whooping-cough 14, diarrhoea and enteritis 9, primary pneumonia 5, and scarlet fever 4.

In *Northern Ireland* increases were recorded in the notifications of measles 18, scarlet fever 9, and whooping-cough 7.

Week Ending May 3

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 873, whooping-cough 2,033, diphtheria 186, measles 8,442, acute pneumonia 516, cerebrospinal fever 52, dysentery 122, smallpox 1, paratyphoid 1, typhoid 1.

No. 17

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 26.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1947 (a)	(b)	(c)	(d)	(e)	1946 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	64	8	31	3	—	48	6	32	—	1
Deaths		—	1				1	2		
Diphtheria	175	22	50	25	9	389	27	104	42	11
Deaths	1	—	—	—	—	1	—	—	1	1
Dysentery	61	4	19	—	—	163	25	63	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	1	—	—	—	—	1	—	—
Deaths		—						—		
Erysipelas			33	16	1			40	8	3
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				19					42	
Deaths	72	9	14	5	1	56	6	2	14	6
Measles*	7,962	408	235	46	36	2,793	1054	354	29	—
Deaths	9	1	—	—	—	6	1	—	—	—
Ophthalmia neonatorum	75	8	24	—	—	50	5	24	—	—
Deaths										
Paratyphoid ever	1	—	—	1(A)	—	5	—	—	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	647	43	5	9	5	654	39	11	21	2
Deaths (from influenza)†	21	5	3	—	—	18	2	1	3	—
Pneumonia, primary		34	231	25	12		28	188	28	7
Deaths				16					14	
Polio-encephalitis, acute	1	—				—	—			
Deaths		—					1			
Poliomyelitis, acute	6	2	—	5	—	5	1	—	1	—
Deaths		—					—			
Puerperal fever		1	10		1		—	23		—
Deaths										
Puerperal pyrexia‡	136	8	11	—	2	148	12	17	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	892	76	150	22	42	1,054	104	147	29	19
Deaths	—	—	—	—	—	3	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	6	1	—	3	1	4	—	—	2	1
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	2,044	256	322	74	20	1,669	139	76	36	5
Deaths	15	2	6	1	—	7	1	1	—	—
Deaths (0-1 year)	472	71	65	21	17	354	50	53	34	18
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	4,788	755	574	212	132	4,553	662	578	197	131
Annual death rate (per 1,000 persons living)			11·9	13·4				12·7	12·6	
Live births	10,155	1626	1317	444	351	8,303	1202	1062	454	258
Annual rate per 1,000 persons living			26·5	28·0				21·4	29·1	
Stillbirths	266	33	30			235	32	40		
Rate per 1,000 total births (including stillborn)			22					36		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

Any Questions ?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

"Hereditary" and "Familial"

Q.—*What are the differences between the terms "hereditary disease" and "familial disease"?*

A.—The characteristic features of human pedigrees associated with the different types of hereditary transmission were known empirically long before the rediscovery of Mendel's work. The use of the terms "hereditary" and "familial" is a survival from those pre-Mendelian days. A regularly expressed dominant gene is handed on by its bearer, necessarily an affected person, to half his children on the average. Normal persons cannot carry the gene and so cannot transmit it. Simply inherited abnormalities are rare, hence affected persons almost invariably marry normals. So we observe the typical dominant pedigree in which every affected person has one affected parent, and affected persons have on the average affected and normal children in equal proportions. The most striking feature is the evident direct transmission from generation to generation. Hence the use of the word "hereditary" to describe the pedigrees of such conditions as multiple telangiectasia, piebalding, or brachydactyly.

In contrast a recessive gene manifests itself only when present in a double dose; that is to say, the abnormal gene must be received from both parents. Such a gene may be transmitted through many generations of outwardly normal carriers. Occasionally a man and woman marry who both happen to carry the same recessive gene; then, on the average, one-quarter of their children will manifest the abnormality. The outwardly normal offspring, and the abnormal ones also (if the condition is compatible with life and reproduction), will rarely happen to marry partners who also carry that gene. So the defect seems to vanish again, not to reappear for perhaps many more generations. Therefore the typical finding is a large number of normal ancestors and collaterals; then the sudden appearance of a sibship containing one, two, or more affected children; then normal descendants and collaterals. This is what is observed in such conditions as amaurotic idiocy, albinism, or xeroderma pigmentosum, to which the word "familial" was applied.

To-day, the mechanism being fully understood, it seems better to use the words "dominant" and "recessive." There is perhaps no harm in using the older terms if it is desired to convey to those unfamiliar with genetics the salient features of the two types of transmission; but, of course, a condition described as "familial" is 100% inherited, just as is a condition described as "hereditary."

Leuconychia

Q.—*What are the aetiology and treatment of transverse linear chalky white markings on the nails? The marks start at the base of the nail and enlarge as they grow towards the tip.*

A.—Leuconychia is due to periodic interference with the growth of the nail at the nail matrix as the result of trauma or toxic, circulatory, or nervous influences. Treatment should be directed to the cause. The trauma of manicuring the nails should be considered.

Arsenicals in Congenital Syphilis

Q.—*What are the dosages of neoarsphenamine, sulpharsphenamine, and bismuth for the treatment of congenital syphilis at different stages?*

A.—In the treatment of late congenital syphilis the dosages of neoarsphenamine, sulpharsphenamine, and bismuth are essentially the same as those used in acquired syphilis; in early congenital syphilis the individual dose of each drug is usually calculated in mg. per kilo of body weight of the patient. In the case of sulpharsphenamine Earle Moore recommends 5 to 10 mg. per kilo for the first dose, rapidly increasing to the desired maximum of 25 mg. per kilo; Lees recommends 10 mg. per kilo during the first year of life, while McLachlan says this latter amount should not be exceeded. The dosage of neoarsphenamine is much the same, though this drug is seldom used in very young infants. The usual dose of bismuth is 2 to 5 mg. per kilo, starting with the lower dose. A course may last about sixty days, and the arsenic and bismuth may be administered concurrently in weekly doses. Four such courses should be the minimum for early congenital syphilis; more are often required, particularly if the serum reactions are slow in reversing.

Ps. pyocyanea and Penicillin

Q.—*The Pseudomonas pyocyanea is said to be insensitive to penicillin; what is the best method of eradicating it from an infected urinary bladder?*

A.—This organism is one of the most resistant to penicillin of all bacteria; it forms penicillinase and thus destroys the drug. It is therefore useless to give penicillin, even in large doses, for a urinary-tract infection so caused. The sensitivity of *Ps. pyocyanea* to sulphonamides is variable; this should be tested with the patient's own organism if possible. If not, sulphathiazole, 1 g. four times a day, might be tried. If this treatment does not succeed within a few days it should be discontinued. Streptomycin, if available, is the most effective drug, although in a minority of cases it fails owing to the acquisition of resistance to it by the infecting organism.

Dental Extraction in Hyperpietic

Q.—*A married woman of 64 has a mouth full of rotten stumps, two of which ooze pus. Her blood pressure is 250/140 mg. Hg, and the heart sounds are strong, regular, and slow; her urine is clear. Is there any sound reason for the advice she has been given not to have nitrous oxide? If so, what anaesthetic or other procedure would you suggest?*

A.—In the hands of a competent anaesthetist nitrous oxide with oxygen administered through a nasal inhaler should be sufficient provided that the patient's general cardiovascular condition, apart from the hyperpiesis, is sound. Should she be unwilling to have nitrous oxide, a local analgesic could probably be used, though it would be advisable to omit the usual adrenaline in the solution. In deciding which method is preferable much depends on the position and firmness of the teeth and the degree of surrounding sepsis.

Treatment of Seborrhoea

Q.—*In a case of seborrhoea, soap spirit, salicylic acid, and sulphur ointment and lotion have given only partial relief; the scalp is still thick with scales and the rash in the axillae and genito-crural regions persists. Is there a newer method of treatment?*

A.—Acute seborrhoeic dermatitis of the type described is symptomatic of general ill-health and each case is an individual problem. There may be underlying foci of infection or metabolic or nutritional imbalance. Psychogenic factors are commonly of major importance; hormonal deficiencies are also often important. In a general way a high intake of protein and of vitamin B with restriction of carbohydrates, fluids, and salt, a mineral alkaline mixture, phenobarbitone in small doses, and possibly oestrogen therapy may help.

Secondary Effects of Vaccines

Q.—*Does antityphoid inoculation boost resistance to other infections? Does it ever activate a latent gonococcal infection? On theoretical grounds are such secondary effects likely to be significant?*

A.—There is no known antigenic relationship between organisms of the enteric group and others quite unrelated which would suggest that any *specific* immunity to other diseases is likely to be produced by T.A.B. vaccine. Whether the administration of bacterial vaccines of almost any composition has some non-specific effect on resistance to infection generally is uncertain; to assume that this is so seems the only way to explain the effects claimed for various vaccines for

many years past. A large dose of a vaccine may cause a transient exacerbation of any chronic infection, including gonorrhoea.

Thorium X for Naevi

Q.—*Thorium X has been used effectively in babies afflicted with capillary naevi. May I have details of its use and indications?*

A.—Thorium X suspended in a varnish, ointment, or in alcohol may be applied at monthly intervals. The strength commonly used is 1,000 electrostatic units per ml. Reference should also be made to another answer given in the *Journal* of April 12, p. 516.

Definition of "Psychopath"

Q.—*What is a psychopath?*

A.—The best definition of a psychopath is that of Kurt Schneider: an abnormal (that is, unusual) personality who by reason of his abnormality either himself suffers or causes society to suffer. In Anglo-American psychiatry the two parts of this definition tend to be separated. The individual who himself suffers under his abnormality is called neurotic, while he who causes society to suffer is called a psychopath. It is, however, important that the same man at different times in his life-history may show both of these two aspects of abnormality, and that the question whether society has or has not suffered may be very differently answered by his contemporaries and by posterity. Any useful definition must have a quality of arbitrariness. Schneider pointed out that abnormal and psychopathic personalities came within the range of normal human variation, and the distinction between normality and abnormality is quantitative and not qualitative.

Tinnitus

Q.—*A woman of 53 has thyrotoxicosis, and tinnitus referred to the right ear, which is slightly deaf. Her blood pressure is 170/90 mm. The thyrotoxicosis has responded to methyl thiouracil, and she is well again except for the tinnitus, which she describes as "burring and thumping." What treatment do you advise?*

A.—The description of the tinnitus suggests an arterial origin; therefore treatment should first be directed to reducing the slight hypertension. If such drugs as sodium nitrite or nitroglycerin prove unavailing, nicotinic acid or nicotinamide in large doses should be tried. Histamine diphosphate injections are sometimes helpful. But in many cases there is no prospect of cure, and the changes must be rung on the various sedatives, of which phenobarbitone and the bromides are the most useful.

Raven's Intelligence Test

Q.—*Is Raven's test—the "progressive matrices"—satisfactory for estimating general intelligence, or is it complicated by a special factor?*

A.—A valuable summary of extensive experience in the Forces of the use of the Raven progressive matrices has been given by P. E. Vernon in a recent paper (*Occup. Psychol.*, 1947, 21, 53). Numerous factorial analyses have shown that the scale is an almost pure *g* test, but that the visuo-spatial or *k* factor is also involved to a small extent. It is stated, however, that the test proved somewhat disappointing in practice. Only when the *k* factor was specially concerned, as it is in certain mechanical duties, did the Raven matrices add appreciably to the information given by other intelligence tests. Its reliability is rather low, and it is especially susceptible to non-intellectual influences such as age and temporary emotional stress. Furthermore it appears to function unequally at different parts of the range of intelligence. Among the bright it correlates highly with the more lengthy scales and probably represents for many purposes a useful twenty minutes of testing time. Among the below-average, however, its reliability is low; hence it appears to be of little use for sorting out backwardness, dullness, and high-grade mental deficiency. Among the very dullest of all it seems to become more efficient once again, but it is doubtful whether at this part of the range it is contributing anything that could not be better measured by other means.

Letters and Notes

Continental Holidays for Invalids

Dr. A. PINEY (London, W.1) writes: I have always regarded myself as a careful reader of the *Journal*, but I have not seen (and cannot trace) any reference to medical certificates for invalids who, in their doctor's opinion, would benefit from a holiday on the Continent but for whose stay £75 would be insufficient. The national newspapers mention that in some cases the Treasury may allow a greater expenditure in order that the holiday may be of sufficient length. The treatment of pulmonary tuberculosis in Swiss sanatoria is an apparently reasonable example, especially as our own sanatoria are so full. In the case of milk and eggs there is, I understand, a committee one of whose duties it is to draw up a list of maladies for which such supplements are permitted, while another is to advise the Minister of Food in doubtful cases. Does a similar committee exist to advise the Treasury? Is there a list of maladies that entitle patients to such certificates for Continental holidays? And is there any considerable body of medical opinion that advocates the treatment of thrombosis by foreign travel?

⁂ We understand from Exchange Control that the expenditure of patients going to Switzerland is not limited provided adequate medical evidence supports their going to that country. They should notify the authorities of the approximate time they intend to spend there and the sum required. Patients should apply on Form T.2, which should be accompanied by a medical certificate. —ED., *B.M.J.*

Summer Prurigo

Dr. J. B. SPEARMAN (Gillingham) writes: I am a sufferer from summer prurigo (April 19, p. 551). When in the R.A.M.C. I was posted for tropical service, I nearly used it to "dodge the column." Yet in India and Burma I had no trouble at all, and could sunbathe with everyone else. Then with return to "civvy street" it reappeared. I usually reckon to see it appear during Whitsuntide, but this year it came out on the Sunday after Easter. I wonder if any of your readers can suggest a reason for its non-appearance in the Tropics? Perhaps it was graduated exposure on the voyage out; I kept out of the sun as much as possible in those weeks—but why should it return in this country?

Edentulous Halitosis

Dr. F. COLEMAN (London, W.1) writes: A more likely cause for an unpleasant taste in the mouth in edentulous patients is the wearing of dentures at night, and especially if they are constructed of vulcanite. A trained observer can always tell whether patients wear their dentures at night from the inflamed condition of the mucous membrane of the palate and gums. In the case of full dentures this represents an area of approximately 10 sq. in. (65 sq. cm.) of inflamed tissue (i.e., five or six in the upper and four or five in the lower). A vulcanite denture is more harmful in this respect owing to its porosity (increased if the rubber be insufficiently vulcanized), which harbours food and debris, apart from the rough surface it presents to the underlying tissues. The treatment should be to instruct patients to remove their dentures at night and to cleanse them, and if this fails to give relief to substitute an acrylic resin or a metal-based denture for the vulcanite denture. Retained roots and buried roots should be excluded as suggested, but are less likely to be the cause of the condition under discussion (*Journal*, May 3, p. 625). It should be noted that the word "halitosis" suggests smell rather than taste, although the two conditions are not infrequently associated.

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